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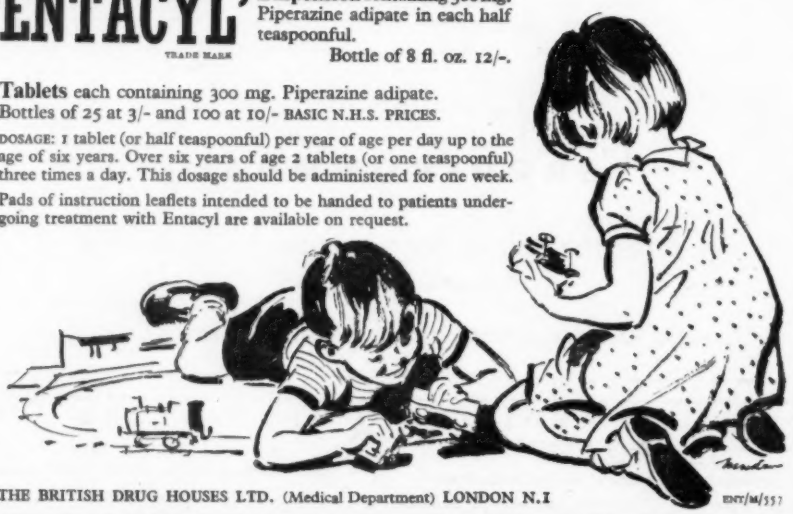

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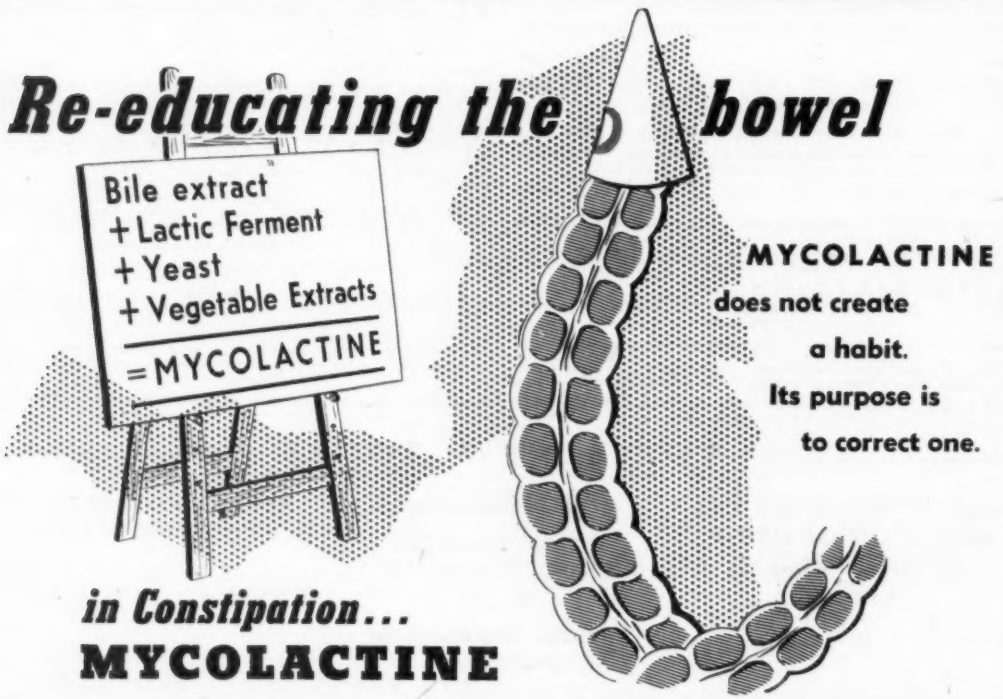

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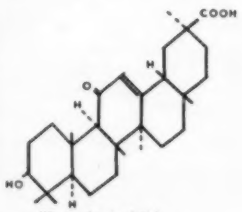

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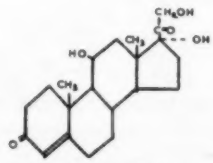

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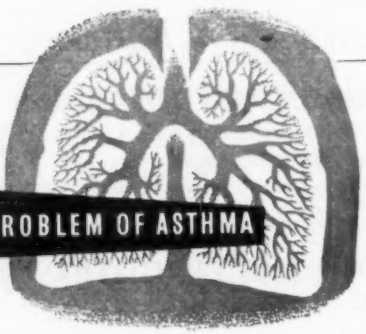

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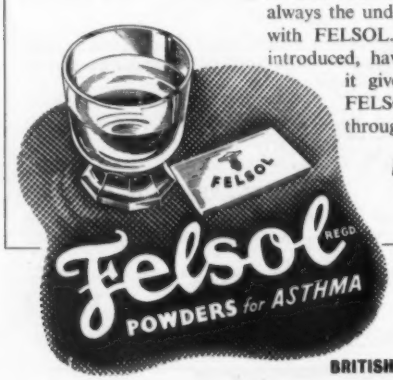

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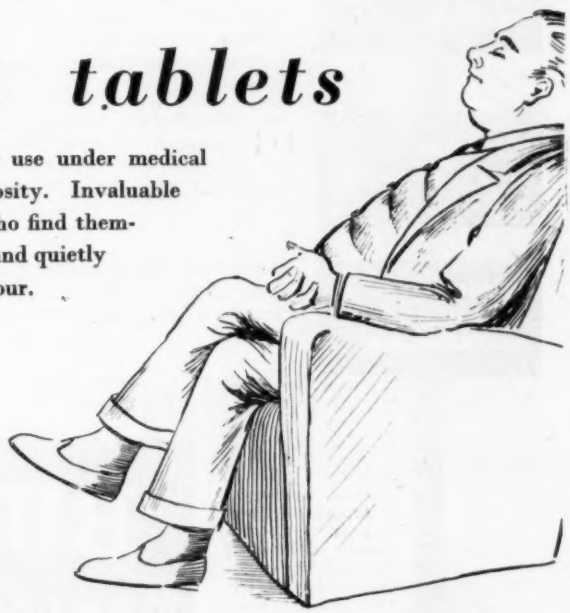

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HAMPDEN PARK · EASTBOURNE · SUSSEX
Telephone: Hampden Park 740. *Telegrams: Armolab Eastbourne.*

ASPIRIN INTOLERANCE IN RHEUMATOID ARTHRITIS

BUFFERIN-

THE NEW BETTER TOLERATED ANALGESIC

A MOST SUCCESSFUL ANSWER TO THE PROBLEM

Following last year's report[1] by the Joint Committee of the Medical Research Council and Nuffield Foundation, many practitioners have returned to aspirin therapy in place of cortisone. Effective therapy with aspirin and similar salicylates unfortunately has been hampered by the problem of gastric irritation, which affects as many as 42% of arthritic patients. Bufferin, the new analgesic which reduces gastric intolerance to a negligible minimum, is a most successful answer to the problem.

BUFFERIN FAR BETTER TOLERATED BY ARTHRITICS

Bufferin combines acetylsalicylic acid with the antacids aluminium glycinate and magnesium carbonate (gentle buffering antacids which do not produce "acid rebound"), and is well tolerated even by arthritics. In blind trials amongst arthritics with proven intolerance to ordinary aspirin, 70% had no gastric symptoms after taking large doses of Bufferin over periods of 4 to 16 months.[2] Previous studies amongst the general population showed that only 1 patient out of 238 had any distress after taking 10 grains of Bufferin.[3]

ACTS TWICE AS QUICKLY AS ASPIRIN

Not only is Bufferin better tolerated by the stomach than ordinary aspirin, but its pain relieving ingredient is absorbed twice as quickly into the blood stream. Trials show that on an average the 10-minute salicylate level after taking Bufferin was more than 20% higher than the 20-minute level after taking ordinary aspirin.[3]

NO EQUIVALENT IN BRITISH PHARMACOPOEIA

Bufferin is unique in incorporating aluminium glycinate and magnesium carbonate as buffering agents and has no equivalent in the British Pharmacopœia or National Formulary. This fully justifies the prescription of Bufferin on E.C.10.

References: 1. *British Medical Journal*, 1954, **1**: 1223. 2. *Journal of the American Medical Association June* 4 1955 p. 387. 3. *J. Amer. Pharm. Assoc.* 1950, **39**: 21.

Further information: A detailed, fully documented leaflet and sample available on request to the makers, Bristol-Myers Co. Ltd., Dept. C, 211 Blackfriars Road, London, S.E.1.

BUFFERIN TRADE MARK
ANTACID ANALGESIC

Formula: Acetylsalicylic Acid 5 gr.: Aluminium Glycinate ¾ gr.: Magnesium Carbonate 1½ gr.

PLASTER
POLYMER
CATALYST

Gypsona
EXTRA

Strength, lightness and resistance to water combine to make this new type of plaster of Paris bandage much more economical in use

Very hard, water resistant casts result when plaster of Paris is polymer reinforced. That is why Gypsona 'Extra' has, in addition to all Gypsona's well-known qualities, these extra advantages :

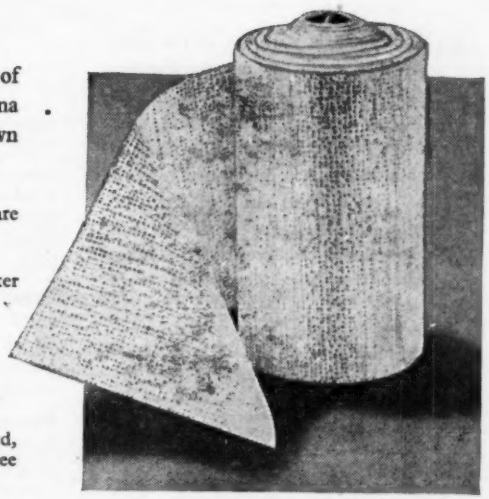
Durability
Gypsona 'Extra' casts outlast all other plaster casts and are more resistant to damage and the effects of water.

Lightness
Casts are thin, comfortable to wear, and therefore allow better functional treatment.

X-rays
Thinner casts permit greater clarity in X-ray photographs.

Cleanliness
Negligible plaster loss means less mess and a saving of time.

Economy
When the recommended method of application is followed, two Gypsona 'Extra' bandages will do the work of every three plaster bandages now used, and a more durable cast results.



(Gypsona standard bandages remain available for those cases where the special qualities of Gypsona 'Extra' are not required)

An S&N product

DETAILS FROM SMITH & NEPHEW LTD · WELWYN GARDEN CITY · HERTS

ASPIRIN is still one of the most useful drugs in paediatrics. Standard 5 grain tablets are not easy to administer, and may cause dosage difficulty. Rasprin tablets have been introduced to meet the need for a safe, prescribable children's aspirin. Each Rasprin tablet gives 1¼ grains of soluble calcium aspirin (equivalent to a quarter of a standard aspirin tablet), making dosage simple, even for infants.

Safe

Each 10 Rasprin tablets is packed in a plastic vial. The amount of aspirin in each container is therefore limited to a total of 12½ grains, making accidental overdose impossible. Rasprin disintegrates in the mouth so quickly that there is no possibility of choking.

Soluble

Each Rasprin tablet contains calcium carbonate, which reacts with the aspirin to produce soluble calcium aspirin; together with citric acid, to start the reaction and ensure quick disintegration.

Pleasant

Rasprin tablets have an inviting colour and a pleasant raspberry flavour which makes them very acceptable to young children.

Economical

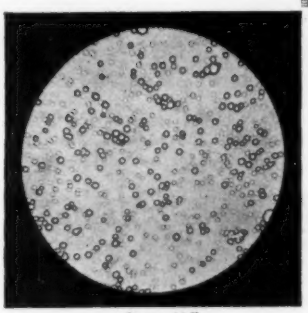
Rasprin is distributed in special dispensing packings, and is free of Purchase Tax. The prescription price is 4d. per vial of 10 tablets.

On Prescription Only

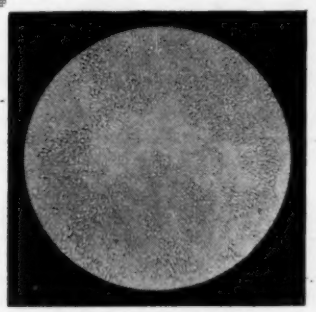
Rasprin is not advertised to the lay public, and may be prescribed on Form E.C. 10.

CARNATION MILK
for Infant Feeding

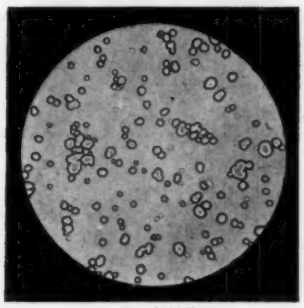
The advantages of *Homogenisation*



1 Breast Milk



2 Carnation Milk diluted to whole milk standard



3 Cows' Milk

The reduced reproductions of photo-micrographs above (originally magnified 560 times) show a direct comparison between the fat globule size and distribution in breast milk, Carnation Milk and cows' milk. It will be seen that the homogenisation process given Carnation Milk breaks down the large globules of ordinary cows' milk and distributes them evenly.

The fat globules of ordinary cows' milk average 5 microns. Carnation globules after homogenisation average 1 micron, and this reduction in size increases the total number of fat globules by a minimum of 125 times. As only the total surface area of the globules has been increased and not the mass, the attraction between fat and serum exceeds gravitational force and a permanent emulsion is formed. Butterfat, therefore, *cannot* separate out.

The advantages of homogenisation when prescribing Carnation Milk are:

1 Fat globule surface area available for enzymic action is increased as much as five times over that of ordinary milks.

2 Complete digestion of the butterfat is practically assured and the irritating effect of free fatty acids, so troublesome with ordinary milk, *is eliminated*.

3 Miscibility of the fat in Carnation Milk with:
- (*a*) Water during feed preparation and without subsequent fat separation.
- (*b*) The contents of the upper digestive tract.

4 Reduction below full-cream value removes proportionately the important nutrients carried by butterfat. These are the Vitamins A, E and K — the phospholipids and sterols of whole milk. Homogenisation renders a full-cream milk superior for all infant feeding.

5 Feeding bottles are easily cleaned by even inexperienced mothers. The risk of bacteria entrapped in a fat film is eliminated.

6 The adaptability of Carnation because of homogenisation permits the use of *one* simple milk for *ALL* infant feeding, with the exception of specific intolerances to milk solids other than whey proteins.

Other attributes of Carnation Milk:

1 Safety, because of sterilisation *after* the Carnation cans are sealed.
2 Hypo-allergenic properties.
3 Uniformity — due to standardisation of solids.
4 Prophylactic D3.
5 Accuracy of measurement.

"The Feeding of Infants" — a book specially for doctors — together with reprints of clinical investigations and Carnation feeding charts are available from: — Medical Department, General Milk Products Limited, Bush House, Aldwych, London, W.C.2.

Carnation Milk *"from contented cows"*

Prevention of Motion Sickness

4

Most successful Drug also Freely Available

IN CAREFULLY CONTROLLED TRIALS (reported in the *Lancet* of 27th October, 1951), the relative values of three drugs were investigated with regard to their efficacy in the prevention of motion sickness at sea. They were hyoscine hydrobromide, diphenhydramine, and promethazine.

Of these three drugs, hyoscine showed itself to be (1) the most effective*, and (2) the freest from unpleasant side-effects.

That is fortunate for those who are subject to this distressing condition. Because hyoscine hydrobromide, in the dosage used against motion sickness, is also the least toxic of the three drugs, and consequently subject to the minimum of restriction.

It has not been possible to conduct similar tests in respect of car, bus and train sickness but a very large empirical experience shows that this form of motion sickness can be prevented equally well with hyoscine.

All pharmacists stock hyoscine as Kwells. They are advertised to the lay public, and therefore fall into the category of medicines which it is "undesirable to prescribe on Form E.C.10." They may be purchased without prescription, and without any other formality.

Each vial of Kwells contains 10 tablets and is sold for 1/6. The manufacturers of Kwells are E. Griffiths Hughes Ltd., P.O. Box 407, Manchester, who would be pleased to send a professional sample on request.

**Lancet, 1951, ii, 749*
**Journal Aviation Med., 16 : 59, 1945*

"A cure in the true sense of the word"

Extract from ***THE*** *BRITISH ENCYCLOPAEDIA OF MEDICAL PRACTICE,*

Cumulative Supplement 1955, p. 79.

"The substances which stimulate peristalsis are produced in the colon itself by the action of B. coli enzymes on the senna glycosides, and the stimulating action is a neuro-muscular one.... This reproduction of the physiological process of normal defaecation is of considerable clinical importance in giving to senna a re-educative action in cases of chronic constipation, so constituting a cure in the true sense of the word. Senokot . . . is the pleasantest and most reliable form of senna."

• In Constipation of Children

"This new preparation can play a valuable part in the treatment of chronic forms of constipation in children as well as in simple cases."
The Medical Press, June 9, 1954, 521.

• In Constipation of the Aged

". . . the results have been most satisfactory and the laxative has been well tolerated and well liked by these elderly patients."
Report from the Sherwood Hospital, Nottingham, 1954.

• In Constipation of Pregnancy

"Senokot has been used as a routine in my unit and has proved suitable during pregnancy as well as in the puerperium."
The Lancet, March 21, 1953, 602.

• In Chronic Constipation

". . . a re-educative value in the treatment of chronic constipation has been demonstrated for the new preparation by a number of workers."
The Medical Press, August 11, 1954, 127.

Prescribed under the N.H.S.: no B.P. equivalent; inexpensive; not advertised to the public.

℞ Senokot

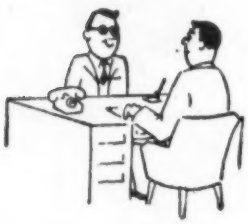
Granules: 1-2 teaspoonfuls. Tablets: 2-4

GRANULES: 2 oz., 6 oz. and 2 lb. TABLETS: 50, 200 and 1,000.

Brit. Pat. No. 683,990

Senokot is sold in Gt. Britain, U.S.A., Canada and in many other countries.

WESTMINSTER LABORATORIES LTD., CHALCOT ROAD, LONDON, N.W.1



Everyone is talking about...

. . . PANADOL—the new Bayer analgesic which contains no aspirin, phenacetin or codeine. Panadol relieves pain without causing side-effects such as gastric irritation or constipation, and is fast becoming established as a safe, effective analgesic for headaches, rheumatic and arthritic pain, colds and 'flu. *Panadol is not a scheduled poison, and may be prescribed on form E.C.*10.

PANADOL

Trade Mark

Tablets, 0.5g. N-acetyl-p-aminophenol, in bottles of 100 *and* 500.

BAYER PRODUCTS LIMITED

Neville House, Kingston-on-Thames, Surrey

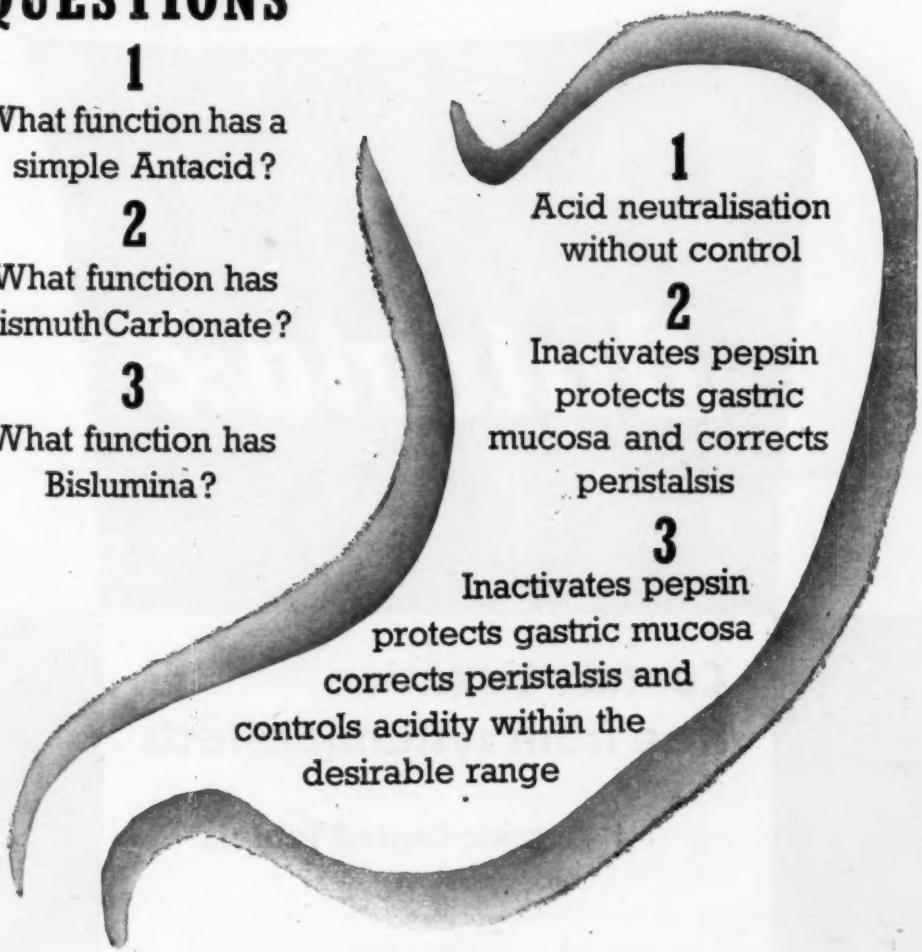
Export enquiries to: WINTHROP PRODUCTS LTD.

QUESTIONS

1
What function has a simple Antacid?

2
What function has Bismuth Carbonate?

3
What function has Bislumina?



1
Acid neutralisation without control

2
Inactivates pepsin protects gastric mucosa and corrects peristalsis

3
Inactivates pepsin protects gastric mucosa corrects peristalsis and controls acidity within the desirable range

Bislumina

THE *UNIQUE* COMPOUND

Detailed literature on request from
Sole Distributors in United Kingdom

C. J. HEWLETT & SON LTD.
King George's Avenue, Watford, Herts.

Manufactured by MINING & CHEMICAL PRODUCTS LIMITED, LONDON.

In accordance with world patents pending.

Bislumina—*is a registered trade mark*

A new compound

(4,4'-diacetoxy-diphenyl)-(pyridyl-2)-methane

Dulcolax

Regd. Trade Mark

Contact Laxative free from systemic effects

Enteric Coated Tablets
act overnight

Suppositories
promptly empty the lower bowel replacing the enema

Supplied
Tablets (enteric coated) of 0.005 g.
Bottles of 30 and 200
Suppositories of 0.01 g. Boxes of 6 and 50

LEWIS LABORATORIES LTD., LEEDS 9

Balanced vitamin intake
for young and old

Routine administration of ABIDEC* Drops and Capsules ensures adequate intake of essential vitamins in patients of all ages. Both preparations contain, in well-balanced proportions, seven important fat and water-soluble vitamins for the prevention and correction of dietary deficiencies.

ABIDEC

Abidec Drops provide an easily administered and comprehensive vitamin supplement during infancy and childhood. A single daily dose is adequate.

Abidec Capsules supply in one daily dose of ONE capsule the approximate vitamin requirements of the average adult or adolescent.

*Trade Mark

PARKE, DAVIS & COMPANY, LIMITED (INC. U.S.A.) HOUNSLOW, MIDDLESEX. Telephone Hounslow 2361

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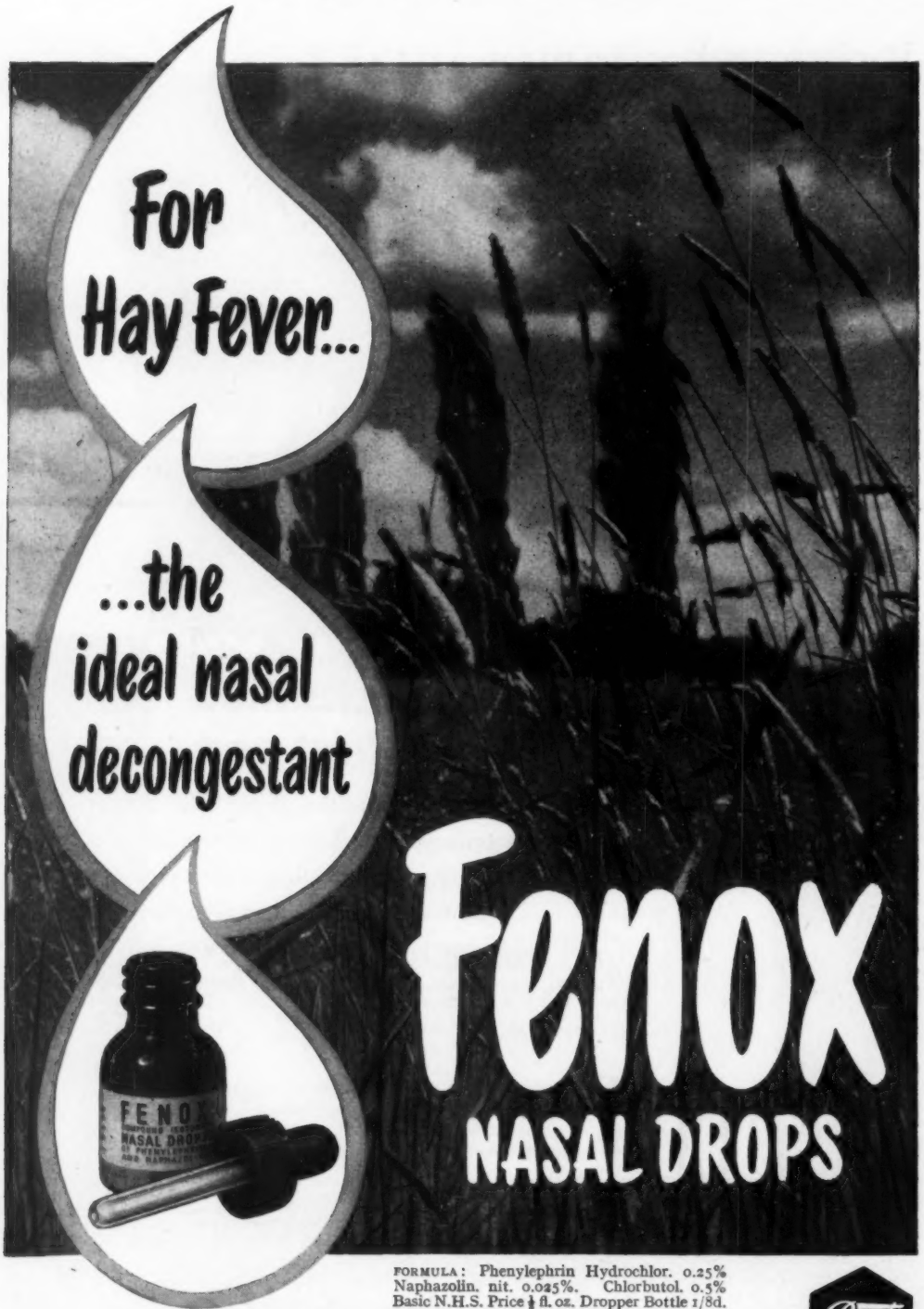


FORMULA: Phenylephrin Hydrochlor. 0.25%
Naphazolin. nit. 0.025%. Chlorbutol. 0.5%
Basic N.H.S. Price ½ fl. oz. Dropper Bottle 1/8d.

Literature and further information obtainable from

BOOTS PURE DRUG COMPANY LIMITED · NOTTINGHAM · ENGLAND

Boots

B 234

SHOCK AFTER BURNS

THIS PATIENT has been badly burned. Plasma is being lost, with a consequent reduction in the colloidal osmotic pressure of the blood.

COLLOID must be infused if blood volume is to be maintained.

A CLEAR CASE FOR DEXTRAVEN, the optimal fraction dextran.

DEXTRAVEN raises the blood pressure swiftly and surely. Loss by renal excretion is minimal and most of what is infused stays in the circulation for at least 24 hours.

DEXTRAVEN can be given immediately by intravenous infusion. Stable indefinitely under all climatic conditions, it requires no special storage precautions.

DEXTRAVEN is approved by the Ministry of Health. Fully descriptive literature is available and a Technical Information Service is always at your disposal.

A clear case for DEXTRAVEN

TRADE MARK

D4. (REV.1)

BENGER LABORATORIES LIMITED · HOLMES CHAPEL · CHESHIRE

A BENGER PRODUCT

the best things in life are not free . . . from hyperacidity

Most patients know when their hyperacidity is caused by over indulgence in food, tobacco or drink. When the cause is not obvious, the doctor may trace gastric distress to emotional strain and nervous tension. In any case, the causes are not easy to remove, but the symptoms are—with Gelusil.

Gelusil promptly and effectively controls the excessive gastric acidity of "heartburn" and chronic indigestion. Its action is sustained, and side-effects do not occur. Gelusil leaves the patient free from constipation and "acid rebound".

Dose: 2 tablets after meals, or whenever symptoms arise.

Formula: Each tablet contains Magnesium Trisilicate 7.5 gr. and Aluminium Hydroxide gel 4 gr.

Packing: In packs of 20 and 50 tablets. Packs of 250 and 500 tablets available to chemists for dispensing.

1856 WARNER 1956

GELUSIL

No Warner preparation has ever been advertised to the Public

WILLIAM R. WARNER & CO. LTD., POWER ROAD, LONDON, W.4.

DRAMAMINE* IN VERTIGO

Labyrinthine Disturbance

Long recognised as a standard for the management of motion sickness, Dramamine has become accepted in the control of a variety of other clinical conditions characterised by vertigo.

Vertigo, it has been claimed†, is primarily due to a disturbance of those organs of the body that are responsible for body balance. When the posture of the head is changed, the gelatinous substance in the semi-circular canals begins to flow. This flow initiates neural impulses which are transmitted to the vestibular nuclei. From this point impulses are sent to different parts of the body to cause the symptom complex of vertigo.

Some impulses reach the eye muscles and cause nystagmus ; some reach the cerebellum and skeletal muscles and righting of the head results ; others activate the emetic centre to result in nausea, while still others reach the cerebrum making the person aware of his disturbed equilibrium. *Vertigo may be caused by a disease or abnormal stimuli of any of these tissues involved in the transmission of the vertigo impulse, including the cerebellum and the end organs.*

A possible explanation of Dramamine's action is that it depresses the overstimulated labyrinthine structure of the inner ear. Depression, therefore, takes place at the point at which these impulses, causing vertigo, nausea and similar disturbances, originate. Some investigators have suggested that Dramamine may have an additional sedative effect on the central nervous system.

Repeated clinical studies have established Dramamine as valuable in the control of the symptoms of Ménière's syndrome, radiation sickness, hypertension vertigo, the vertigo of fenestration procedures, labyrinthitis and vestibular dysfunction associated with antibiotic therapy, as well as in motion sickness.

Any of these conditions in which Dramamine is effective may be classed as "disease or abnormal stimuli"† of the tissues including the end organs (gastro-intestinal tract, eyes) and their nerve pathways to the labyrinth.

Dramamine (brand of dimenhydrinate) is supplied in tablets of 50 mg. in bottles of 12, 36, 100 and 1000 tablets and in cartons (10 strips of 10 tablets). G. D. Searle & Co., Ltd., 83, Crawford Street, London, W.1.

The site of Dramamine's action is probably in the labyrinthine structure.

* *Regd. Trade Mark*

†"Dizziness": Vertigo and Syncope, G.P. 8:35 (Nov.) 1953.

SEARLE

Announcing

Cordex*

for

additive anti-inflammatory effects

decreased side-effects

In rheumatic disease Aspirin + Delta-Cortef (PREDNISOLONE) = **Cordex**

Cordex combines Delta-Cortef and acetylsalicylic acid to provide the additive *anti-inflammatory* activity of each drug, plus the *analgesic* action of the salicylate. With this combination relief of pain is normally afforded in 24 to 72 hours. In the amount employed, Cordex achieves an effect equal to that produced by 2 or more times the amount of adrenal steroid alone. This combination permits a reduction in the dosage of each component, which results in a decrease in undesired side reactions. Indicated in: fibrositis, tendinitis, synovitis, myositis, bursitis, neuritis, lumbago, painful shoulder, non-articular rheumatism, allergic arthritis, osteoarthritis and mild or low-grade rheumatoid arthritis.

Each CORDEX tablet contains:—

Delta-1-hydrocortisone (Prednisolone).....0.5 mg. Acetylsalicylic acid.....300.0 mg.

Average dosage 1-2 tablets four times a day. Bottles of 100 tablets.

CORDEX is at present available to hospitals only

*Trade mark

Upjohn **UPJOHN OF ENGLAND LTD.** 4 Aldford Street, Park Lane, London, W 1

The secret of sleep...

in a capsule

Lilly **BARBITURATES**

'SECONAL SODIUM'
Quick onset - short duration.
In 'Pulvules' ¾ gr. and 1½ grs.

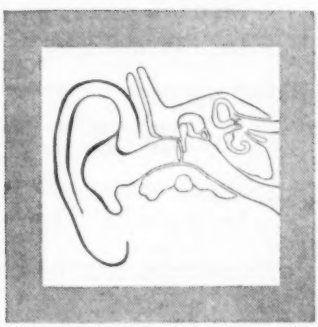
'SODIUM AMYTAL'
Medium onset and duration.
In 'Pulvules' 1 gr. and 3 grs.

'TUINAL'
Quick onset - medium duration.
In 'Pulvules' 1½ grs. and 3 grs.

ELI LILLY & COMPANY LIMITED, BASINGSTOKE, ENGLAND

simpler, swifter, surer
treatment for ear infection

CHLOROMYCETIN* Ear Drops greatly reduce the time and effort necessary to treat suppurative otitis media, chronic otorrhoea, and infections of fenestration and mastoid operation cavities. Treatment can be conveniently carried out, if necessary in the patient's home, and is effective in a matter of days as compared with previous techniques requiring long and tedious application under close supervision.



CHLOROMYCETIN *Trade Mark

EAR DROPS 10%

(Chloromycetin 10% in propylene glycol) in 5 c.c. vials, with dropper, & bottles of 100 c.c.

Parke, Davis
& Company Limited (Inc. U.S.A.)
HOUNSLOW, MIDDLESEX
Telephone Hounslow 2361

382

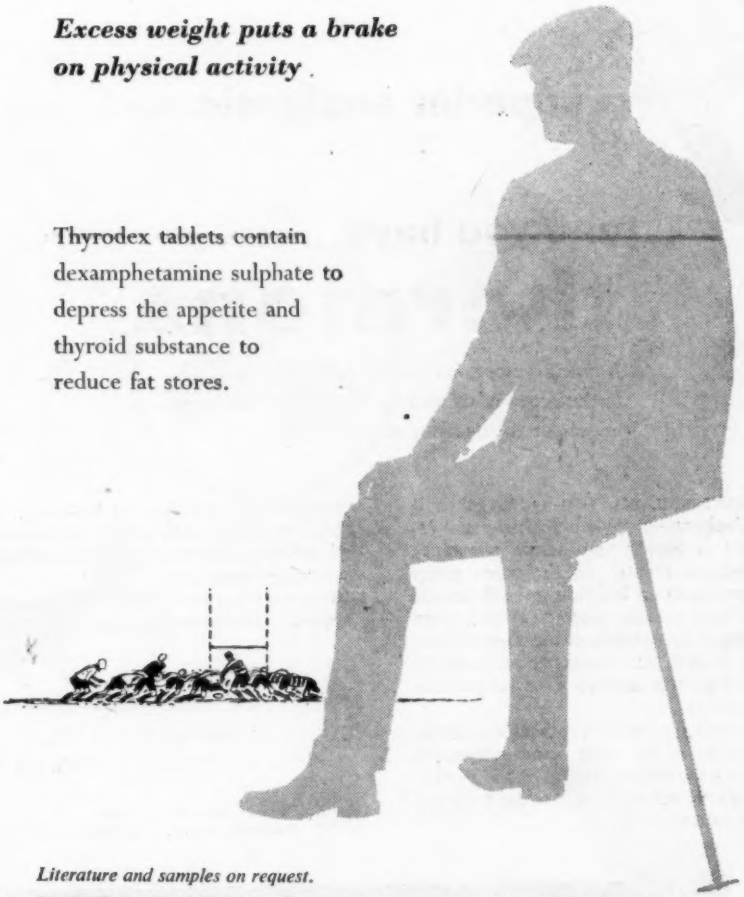
A well-proved formula

THYRODEX

TABLETS

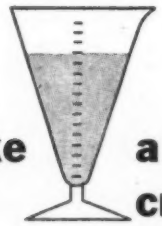
Excess weight puts a brake on physical activity.

Thyrodex tablets contain dexamphetamine sulphate to depress the appetite and thyroid substance to reduce fat stores.



Literature and samples on request.

PAINES & BYRNE LTD., Pabyrn Laboratories, Greenford, England.



Take a conventional analgesic cream formula and add

① **a powerful vasodilator** *(Perdilatal)*

② **a superior analgesic** *(Propyl salicylamide)*

and you have

thermona

TRADE NAME

A new development for the relief of pain in the group of conditions covered by the terms 'muscular rheumatism' or 'fibrositis'.

The vasodilator PERDILATAL (1-(p-hydroxyphenyl)-2-(l'methyl-3'-phenyl-propylamino)-propanol-(1) hydrochloride): a highly vaso-active substance formerly known as Dilatal which, when given systemically, produces an increase in both muscle circulation (1) and cardiac output (2) and gives rise to a prolonged hyperaemia of the deep tissues. **The analgesic** PROPYL SALICYLAMIDE: an analgesic more powerful than other derivatives of salicylamide and salicylic acid (3).

Methyl nicotinate, a superficial rubefacient, facilitates the absorption of the other active substances through the skin and reinforces the effect of Perdilatal. Similarly glycol salicylate adds to the analgesic effect of propyl salicylamide.

THERMONA contains the following ingredients: 0.3% Perdilatal, 1.0% methyl nicotinate, 5.0% propyl salicylamide, 10.0% glycol salicylate, 83.7% vanishing cream base.

THERMONA is available in tubes containing 20.G. (approx.). It is prescribable on N.H.S. form E.C.10.

references

1 *Z. KreislForsch.* 1954, 43, 756

2 *Angiology* 1954, 5, 314

3 *J. Pharmacy & Pharmacol.* 1952, 4, 872

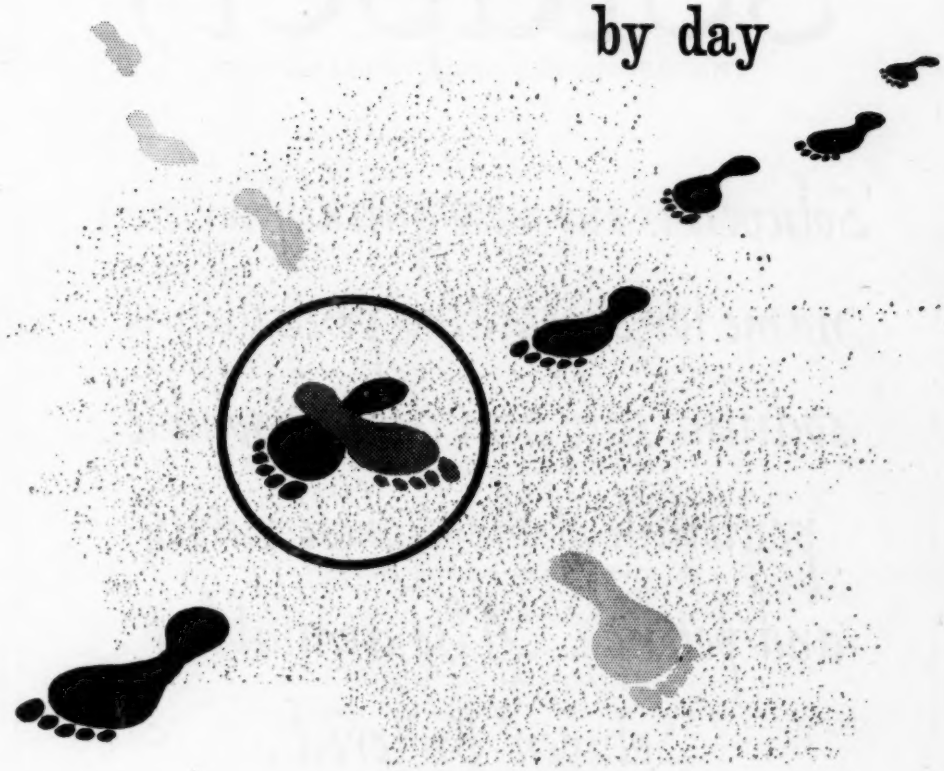
S&N *Further information from Smith & Nephew Ltd., Welwyn Garden City, Herts.*

'ASTEROL'

For TINEA PEDIS

TINCTURE supplemented
by **POWDER** for dusting
into socks and stockings

by day



and **OINTMENT**

at night

Packings: **ASTEROL TINCTURE** (5 per cent) is available in bottles of 30 c.c. and 250 c.c.
ASTEROL OINTMENT (5 per cent) is available in tubes of 25 g.
ASTEROL POWDER (5 per cent) is available in tins of 30 g.

ROCHE PRODUCTS LIMITED · 15 MANCHESTER SQUARE · LONDON · W.1

℞

'Solupen'

'Solupen' is our new quickly-written name for crystalline penicillin G sodium salt and denotes soluble penicillin of the highest purity and potency. Also available – 'Solupen' Buffered.

THE DISTILLERS COMPANY (*Biochemicals*) LIMITED

SPEKE, LIVERPOOL 19. *Tel:* HUNTS CROSS 1271

'Solupen' is a registered trade mark, the property of the manufacturers.

PPH 6/56

Antistin-Privine

ANTI-ALLERGIC AND DECONGESTANT

IMMEDIATE RELIEF

IN HAY FEVER AND OTHER

ALLERGIC RHINORRHOEAS

Prolonged freedom from symptoms

follows a single application

POCKET NEBULISERS • DROPPER BOTTLES

Antistin-Privine contains 0.5% Antistin (2-phenylbenzylaminomethyl-imidazoline) and 0.025% Privine (2-naphthylmethyl-imidazoline nitrate)

C I B A

'Antistin' and 'Privine' are registered trade marks. Reg. usm

CIBA LABORATORIES LIMITED, HORSHAM, SUSSEX

Telephone : Horsham 4321 Telegrams : Cibalabs, Horsham.

14/5

Cortisone derivative . . . .

DeCortisyl

PREDNISONE

ROUSSEL

SUPERIOR THERAPEUTIC EFFECT

IN QUANTITY AND IN QUALITY DeCortisyl is four times more potent than Cortisyl, but it is not simply a "stronger cortisone" as it also appears to possess a therapeutic action of far superior quality.

Indeed, with equivalent dosage (one quarter that of cortisone), the anti-inflammatory, anti-allergic and anti-rheumatic power of DeCortisyl allows much greater clinical control: *thus DeCortisyl is particularly spectacular in cases in which the therapeutic response to cortisone, in full doses, is inadequate.*

REDUCED SIDE EFFECTS

NO SALT RETENTION
NO POTASSIUM LOSS
NO OEDEMA
NO HYPERTENSION

As with cortisone, periodic X-rays for possible peptic ulcer and prophylactic "... routine co-administration of an aluminium hydroxide gel" are advisable.
J. Amer. med. Ass., (1955): **158,** 459.

Average daily dosage:
Initial, 20-30 mg.
Maintenance, 5-20 mg.

DeCortisyl is presented in:
5 mg. tablets, in bottles of 30.

ROUSSEL
LONDON N.W.10
LADbroke 3608

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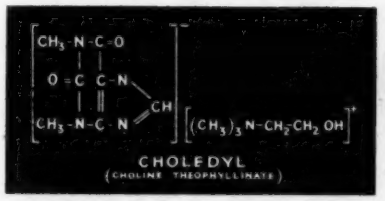
★CHOLEDYL

A major advance in ORAL xanthine therapy



What is Choledyl?

Choledyl (choline theophyllinate), is a completely new approach to oral theophylline therapy. It is a stable, true, chemical compound. Choledyl is clinically superior to oral aminophylline and provides a predictable therapeutic response.

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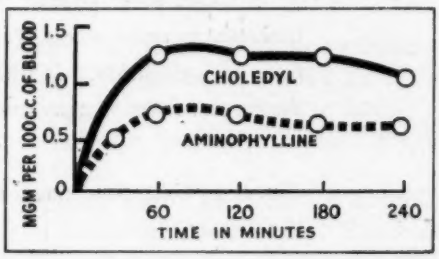
COMPARISON OF THEOPHYLLINE BLOOD LEVELS FOLLOWING A SINGLE ORAL DOSE OF 800 mg. CHOLEDYL AND FOLLOWING A SINGLE ORAL DOSE OF 800 mg. AMINOPHYLLINE.



PRESENTATION

Choledyl is available in tablet form in two strengths each tablet containing Choline Theophyllinate,

100 mg. (coloured pink) or **200** mg. (coloured yellow)
Supplied in bottles of 100 and 500 tablets

● Literature and Sample on application

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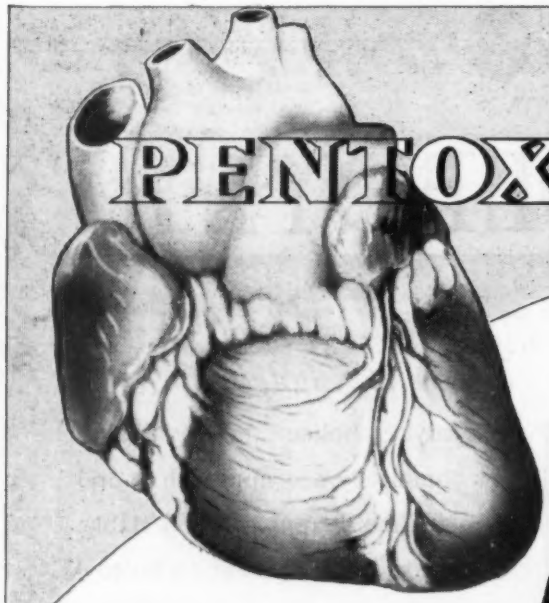

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North-West Med. (1955) 54: 34

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'ACTIDIL' ELIXIR *in bottles of 20 fluid ounces, for dispensing, at a list price (subject) of 15/-.*

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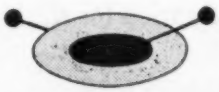

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CHRONIC PYELONEPHRITIS *

JAN BROD
M.D. Prague

ASSISTANT PROFESSOR OF MEDICINE, CHARLES UNIVERSITY; DEPUTY DIRECTOR OF THE INSTITUTE FOR CARDIOVASCULAR RESEARCH, PRAGUE-KRČ, CZECHOSLOVAKIA

"CHRONIC pyelonephritis" denotes inflammation which has spread to the kidney from an infected renal pelvis. The inflammation is interstitial and scars and destroys the surrounding parenchyma in a patchy distribution, and there are great differences in the extent of inflammation and destruction not only between the two kidneys but also between different parts of one and the same kidney. The structures affected most seriously by pressure, interference with nutrition, and the toxic by-products of inflammation are the tubules, which are atrophic and often cystic and dilated, and often disappear in the inflamed tissue. The glomeruli, on the other hand, retain their normal structure much longer, being destroyed only when the inflammation breaks through the wall of Bowman's capsule (the "invasive

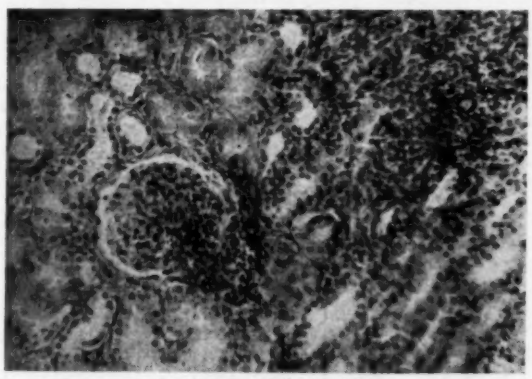

Fig. 1—Invasive glomerulitis.

glomerulitis" [fig. 1] of Kimmelstiel and Wilson [1936]) or when the afferent arteriole is damaged by hypertension (the "alterative glomerulitis" of the same workers).

In two-thirds of the cases the pyelonephritis is secondary, being a complication of a primary lesion elsewhere in the urinary tract; but in the remaining third the pyelonephritis is primary, there being no obvious lesions in the ureters or in the renal pelves. If infection is responsible in these latter cases it must be blood-borne. Sampson (1903) and other workers, however, have shown that hæmatogenous infection produces pyelonephritis only if the free flow of urine has been disturbed. Therefore in the absence of organic obstruction there must be functional interference with the flow of urine.

Infection, however, is not indispensable in the pathogenesis of pyelonephritis. Simonsen (1953), in his work on the fate of renal transplants, found morphological changes similar to those of chronic pyelonephritis without any evidence of infection; they were probably of allergic origin. I do not intend to discuss here the details of the pathogenesis and the paths along which infection and inflammation spread from renal pelvis to kidney. Whatever these paths, the result in the kidney is the same.

Pyelonephritis has been well known to pathologists for a hundred years but little known to clinicians, and has usually been diagnosed only by urologists as a late complication of renal failure in disease of the urinary tract. For decades pathologists have increasingly called attention to pyelonephritis, and some physicians have recognised its importance, especially in hypertension (Butler 1937, Longcope 1937, Weiss and Parker 1939, Pickering and Heptinstall 1953, Langley and Platt 1947, and others).

Raaschou (1948) focused the attention of clinicians and nephrologists on this important, common, and dangerous disease. Using clearance techniques he showed that pyelonephritis affects the function of the kidney in rather a specific way. He also established that, in Copenhagen, pyelonephritis was the commonest cause of uræmia, being found in 1 in every 14 necropsies (6·3%).

The prevalence of pyelonephritis in our population is almost exactly the same as that found by Raaschou: of 1196 necropsies in the pathological department of the Thomayer Hospital, Prague, in two and a half years Horák and Kratochvílová (1955) found chronic pyelonephritis in 74 (6·18%). In 48 (65%) it was a complication of primary lesions of the urinary tract; in 26 (35%) it was a primary lesion without any obvious change elsewhere in the urinary tract. Hypertension was a complication in 41·8% of the cases, being commoner in the primary cases (65·3%) than in the secondary (29·1%). A surprisingly high proportion of both primary and secondary cases had escaped clinical recognition—50 of 74 (67·5%).

The seriousness of this lack of clinical recognition of pyelonephritis is obvious from the causes of uræmia in 69 deaths from renal failure in the necropsy material of the same period although chronic pyelonephritis was less common than in Raaschou's (1948) material, it was the commonest renal cause of death, accounting for 36·2% of cases of uræmia, whereas glomerulonephritis accounted for 18·8% and vascular nephrosclerosis for 14·5%, leaving 30·5% due to other and far less important causes (renal amyloidosis, polycystic kidneys, acute renal failure, &c.).

These pathological data show how important it is to improve the clinical diagnosis of pyelonephritis.

Material

I began to be interested in pyelonephritis in 1948, when a patient presented with what appeared to be malignant hypertension and a renal functional pattern which differed from that usually found in malignant nephrosclerosis. At necropsy chronic pyelonephritis was found. In a report of this case to our cardiological society I suggested that the disturbance of renal function might be specific for pyelonephritis (Brod 1948). In that same year I observed several similar cases, all of which I diagnosed as chronic pyelonephritis on the disturbances of renal function, the diagnosis being confirmed by the pathologist.

Since then 132 cases have been diagnosed in this institute as chronic pyelonephritis on clinical grounds. The study of this group has yielded data which may contribute to a better understanding of pyelonephritis, and to its better diagnosis by methods within the competence of almost any small general hospital.

Our group comprises mainly patients treated as either inpatients or outpatients on the medical side. It constitutes, however, only about half the cases of pyelonephritis. The other half comes under the care of either urologists or gynæcologists, the clinical picture being primarily either urological or gynæcological.

The data which we obtained on renal function in some of these latter cases did not differ materially from those in our medical patients; so perhaps the conclusions reached in our group may also be valid in the surgical cases.

Correlation of Clinical Diagnosis with Pathology

Fig. 2 shows that, of 22 patients who were diagnosed clinically as having chronic pyelonephritis and underwent either biopsy or necropsy (16·7% of the whole group), the diagnosis was confirmed morphologically in 20 (91% of the 22 patients). Of the 2 patients in whom the diagnosis was not confirmed morphologically, 1 had a thrombosed renal artery, and the other malignant

* Paper read at a meeting of the Danish Society for Internal Medicine in Copenhagen, Oct. 28, 1955.

nephrosclerosis in a kidney displaced into the pelvis without obvious chronic pyelonephritis.

The clinical and the pathological diagnosis agreed in 49 (91%) of 54 cases of chronic glomerulonephritis and in all 16 cases of vascular nephrosclerosis.

These satisfactory results allow us to draw conclusions from our clinical group with the same certainty as from other diseases diagnosed clinically.

Diagnosis

History

A very thorough history of present and past symptoms was first obtained.

44·7% of the patients complained of either present or past *frequency and dysuria* (symptoms of inflammation of the urinary tract), and 64·4% of either present or past *pain* in the loins; this was of the severe colicky type in those with a history of lithiasis, but more frequently the pain was dull. In 35·6% of the cases, however, there was no pain. This shows that interstitial inflammation in the kidney is painless, and that any pain present must be due to another cause—probably spread of the inflammation to structures in the neighbourhood of the renal pelvis, or irregular contraction of the ureters.

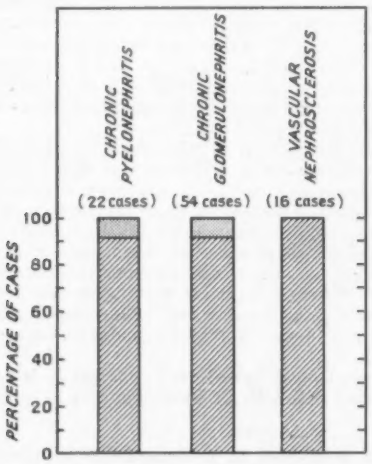

Fig. 2—Incidence of agreement (hatched areas) of clinical and pathological diagnoses.

Clinical Examination

Routine physical examination included that of the genitalia, palpation per rectum, and retinoscopy.

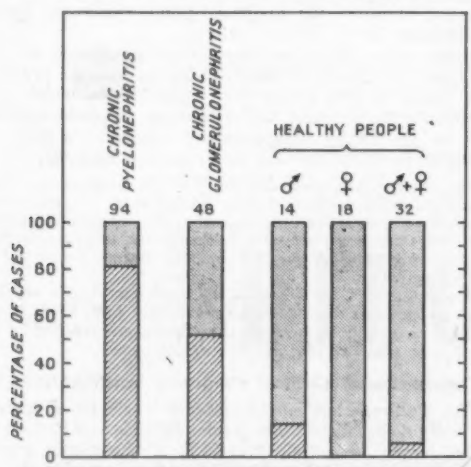

Fig. 3—Incidence of pathogenic bacteria (hatched areas).

Pyelonephritis and glomerulonephritis ..	13·978<0·001
Pyelonephritis and healthy	58·412<0·001
Glomerulonephritis and healthy	18·038<0·001

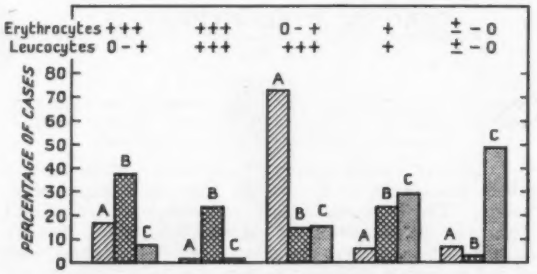

Fig. 4—Cells in urinary deposit: A, chronic pyelonephritis; B, chronic glomerulonephritis; C, nephrosclerosis.

Pyrexia, rarely exceeding 100·4°F, was found in only 25·0% of the patients.

From a quarter to a third of them complained of vague *constitutional symptoms*—e.g., lassitude, malaise, headache, anorexia, nausea, dyspepsia, and breathlessness on exertion. In about two-thirds of the patients all these symptoms could be correlated with late renal failure, hypertension, or pyrexia; but in about a third of them no such explanation was forthcoming, and the symptoms had to be attributed to the focal inflammation in the kidney.

17·25% of all the patients and 40·0% of those with primary pyelonephritis were referred because of a chance discovery of proteinuria; 8·33% because of high blood-pressure; and 1·5% because of thirst and polyuria; but, when questioned specifically, 21·9% admitted to thirst and 11·4% to polyuria.

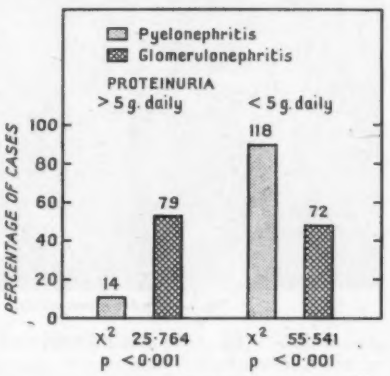

Fig. 5—Proteinuria.

Routine physical examination yields practically no further information, unless pathological changes in the pelvis or in the genitalia, hypertension, or signs due to renal failure are found. Although 23 patients reported having had œdema, it could be explained by extrarenal causes in 21 of them.

Laboratory Investigations

Little is gained from routine laboratory examinations, including chest radiography, electrocardiography, estimation of the erythrocyte-sedimentation rate (E.S.R.), blood-count, and estimation of non-protein nitrogen, plasma-proteins, and cholesterol.

A rise in the E.S.R., a fall in the red-cell count, and a decrease in the amount of hæmoglobin correlate best with renal failure, poorly with pyrexia, and irregularly with the inflammation in the kidneys. A slight increase in the white-cell count was observed in 25% of the patients with pyrexia.

Thus, the history, clinical examination, and ordinary laboratory tests in pyelonephritis without renal failure afford, at most, only information about the presence or absence of inflammation in the urinary tract, without

locating it when present. To do this it is necessary to study the urine and renal function. This study consisted in analysis of the urine, an Addis count, a twenty-four-hour curve of the glomerular filtration-rate (assessed by endogenous creatinine clearance), concentration and dilution tests, intravenous pyelography, and, when necessary, urological examination, including ascending pyelography and estimation of separate concentration indices ($\frac{U}{P}$ ratio) of endogenous creatinine.

Bacteriology

The causal micro-organisms can often be cultured from the urine. Fig. 3 shows that pathogens—i.e., bacteria other than *Staphylococcus albus*—were found in the urine of 81% of the patients, irrespective of sex and of whether the pyelonephritis was primary or secondary. This is in striking contrast with the findings in 30 healthy people, in whom pathogens were present in the urine of only 6%. Moreover in healthy females, from whom bladder urine was obtained through a catheter, pathogens were not found at all, whereas in healthy men, who provided mid-stream specimens, pathogens were found in 14%, but never any *Escherichia coli*. The pathogens in male urine obviously came from the urethra.

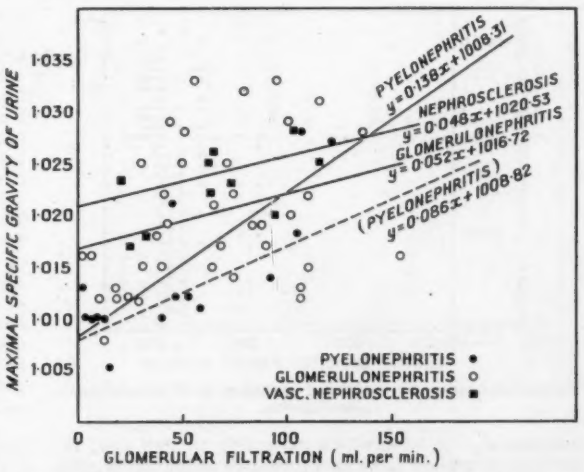

Fig. 8—Correlation of glomerular filtration-rate and maximal specific gravity of urine. If 2 cases of chronic pyelonephritis with unusually high powers of concentrating urine are excluded, regression line is as shown by interrupted line.

In chronic glomerulonephritis there was an unexplained and relatively high prevalence of pathogens in the urine (no sex difference was found in this disease); but the prevalence of infected urine in chronic pyelonephritis was significantly higher. Among these organisms *Esch. coli* was the most frequent (45%). *Staph. aureus* (28%) and *Streptococcus fæcalis* (27%) came next, while proteus (3·27%) and *Pseudomonas aeruginosa* (4·26%) were found in only a few of our patients—no doubt because there were no heavily infected urological cases among them.

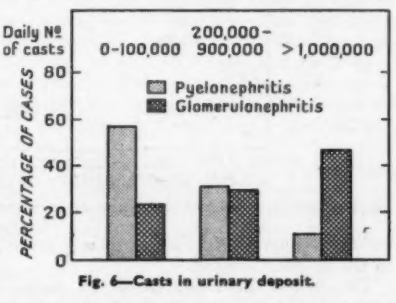

Fig. 6—Casts in urinary deposit.

Addis Count

The second most important sign of inflammation of the urinary tract, simultaneously indicating its severity, is the quantity of leucocytes in the urine, estimated by the Addis count. Leucocytes formed the greater part of the urinary deposit in 76% of the patients (fig. 4). In glomerulonephritis and vascular nephrosclerosis this happened in only about 14% of cases.

In 16% of the patients with chronic pyelonephritis there were more erythrocytes than leucocytes in the urinary deposit. Most of these patients had a history of either cystopyelitis or lithiasis, and the bleeding was obviously due either to hyperæmia or to trauma of the mucosa of the urinary tract. In glomerulonephritis, on the other hand, this happened in more than a third of the cases, and in vascular nephrosclerosis in only 7%.

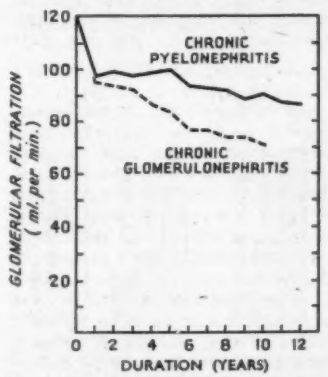

Fig. 7—Changes in glomerular filtration-rate.

Large and equal increases of both erythrocytes and leucocytes argue against chronic pyelonephritis and in favour of glomerulonephritis. The most typical finding in vascular nephrosclerosis was a very small urinary deposit with very slight and equal increases of both erythrocytes and leucocytes.

With only this indirect and direct evidence of infection and inflammation we could not, of course, localise the inflammation. Only if we find signs of functional renal damage due to the spread of inflammation to renal interstitial tissue, and to damage and destruction of the surrounding structures, can we be reasonably certain about our diagnosis of pyelonephritis.

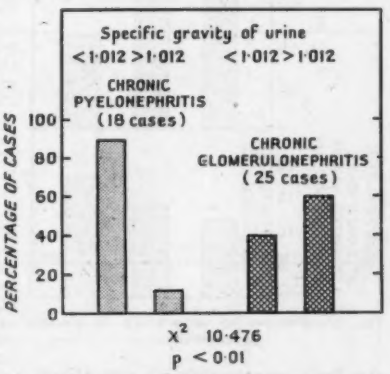

Fig. 9—Incidence of inability to concentrate urine to sp. gr. >1·012, with glomerular filtration-rate <30 ml. per min.

Proteinuria

The late destruction of the glomeruli in pyelonephritis has been emphasised, but the presence of a severe toxic process in the immediate neighbourhood of the glomeruli will damage their finest structures (the walls of the capillaries) so much that they will leak protein, and proteinuria will ensue. Contrary to what happens in glomerulonephritis, which attacks the glomeruli primarily, the quantity of protein in the urine in pyelonephritis rarely exceeds 5 g. daily (fig. 5).

Protein in urine in the tubules and degenerated cells of the tubules yields material from which casts may

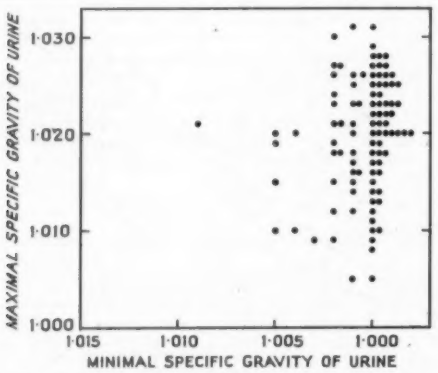

Fig. 10—Correlation of maximal and minimal sp. gr. of urine in chronic pyelonephritis.

be formed. It is therefore surprising to find that the number of urinary casts in chronic pyelonephritis is much smaller than that in glomerulonephritis, seldom being more than 1,000,000 a day (fig. 6); more than 2,000,000 a day was quite exceptional. The reason for this difference between the two diseases is not clear.

Glomerular Filtration

The changes of glomerular filtration over several years in pyelonephritis and in glomerulonephritis are shown in fig. 7.

Fig. 7 was constructed on the assumptions that: (1) before the start of their disease, all the patients had a normal average glomerular filtration-rate of 120 ml. a minute; (2) glomerular filtration decreased regularly from this rate to that found on our first examination; and (3) it continued to decrease regularly from then to subsequent examinations in our laboratory. Data for the intervening years were interpolated. Although the assumptions are unwarranted, the individual deviations from the regular course are certainly in both directions and cancel each other.

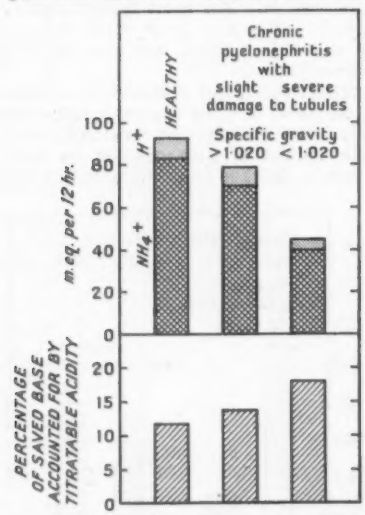

Fig. 11—Changes in base-saving in chronic pyelonephritis.

A greater obstacle distorting the result is the difficulty of establishing the time of onset of pyelonephritis. The onset was assumed to coincide with the first symptoms; this was almost certainly wrong in most cases and tended to make the course of the disease appear shorter than it was and to give the graph a steeper downward trend. We have to bear this in mind when analysing the diagram.

The diagram, however, shows clearly that in chronic pyelonephritis glomerular filtration is gradually decreased, but not so fast as in glomerulonephritis. This is in good agreement with the anatomical facts.

Function of Tubules

Grave damage is done to the tubules from the onset of pyelonephritis and disturbs their function. Many nephrons become passive channels which have more or less lost the power of fine differential reabsorption and active excretion.

Little work has been done in our laboratory on the functions of the proximal tubules in pyelonephritis; so I cannot add to the findings of Raaschou (1948). These functions can only be assessed by rather tedious techniques requiring well-equipped and well-staffed laboratories.

The distal tubules are also damaged from the onset. These tubules form the section of the nephron which, according to current views, reacts sensitively to changes of the blood-level of the antidiuretic hormone. By excreting urine of a higher or lower osmolarity than that of the extracellular fluid the distal tubules regulate changes of osmotic pressure (and possibly of volume) of the *milieu intérieur*. Also, by exchanging sodium (which accompanies acid radicals in the extracellular fluid and glomerular filtrate) for hydrogen, potassium, and

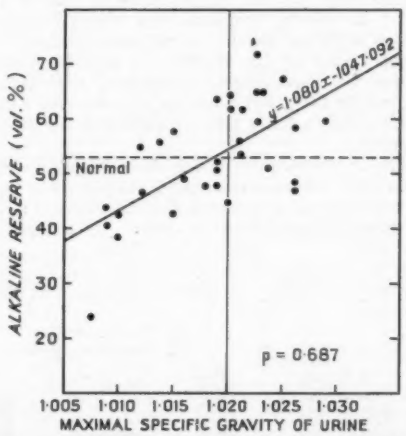

Fig. 12—Correlation of maximal sp. gr. of urine and alkaline reserve.

ammonia ions, they help to regulate the acid-base balance of the *milieu intérieur*.

Functional disturbances of the distal tubules can be found in the earliest stages of chronic pyelonephritis by methods practised in most general hospitals. Thus, in almost every case of acute pyelitis, or even transient obstruction of the urinary tract, there is protracted impairment of the concentrating ability of the kidneys. It was this loss of concentrating power, quite out of proportion to the degree of impairment of the glomerular filtration-rate, that brought our attention to this particular disturbance of function.

The dissociation between the reduction of glomerular filtration and the concentrating ability was one of the

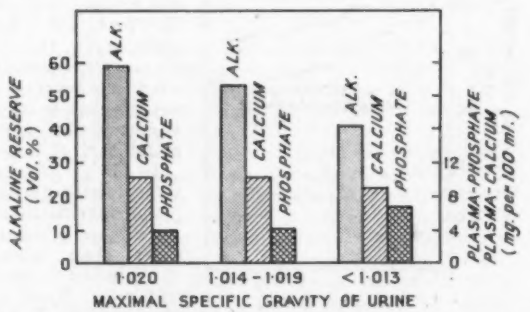

Fig. 13—Correlation of maximal sp. gr. of urine and alkaline reserve, plasma-calcium, and plasma-phosphate levels.

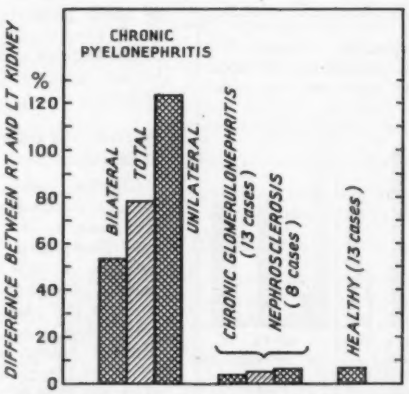

Fig. 14—Comparison of concentrating powers of right and left kidneys.

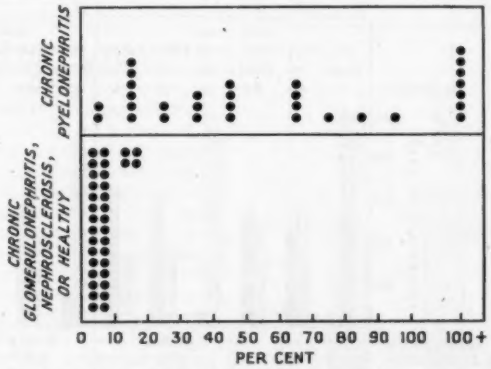
CHRONIC PYELONEPHRITIS
CHRONIC GLOMERULONEPHRITIS, NEPHROSCLEROSIS, OR HEALTHY
0 10 20 30 40 50 60 70 80 90 100 100+
PER CENT

Fig. 15—Individual differences in concentrating powers of right and left kidneys.

main criteria of the clinical diagnosis of chronic pyelonephritis. It was therefore necessary to verify the validity of this criterion in 20 cases in which the clinical diagnosis was confirmed by either biopsy or necropsy. The findings were compared with those in 49 cases of chronic glomerulonephritis and 16 of vascular nephrosclerosis similarly confirmed (fig. 8).

In fig. 8 the regression line correlating glomerular filtration with maximal concentrating ability is lower in chronic pyelonephritis than in glomerulonephritis, which gives a lower regression line than does vascular nephrosclerosis. This fact supports our previous conclusion that, at all stages of reduction of the glomerular filtration-rate, the impairment of concentrating ability is more severe in chronic pyelonephritis than in chronic glomerulonephritis. It also confirms that the loss of function of the distal tubules in vascular nephrosclerosis is gradual and late.

Closer inspection of fig. 8 reveals another theoretically interesting and clinically important feature of the isosthenuria of pyelonephritis. In patients whose glomerular filtration-rate has fallen below 30 ml. a minute the specific gravity of the urine is less than 1·012 (sometimes less than 1·010) more often in pyelonephritis than in chronic glomerulonephritis. This is still more obvious in fig. 9. Only 10 of 25 patients (40%) with chronic glomerulonephritis, with isosthenuria, and such low average glomerular filtration-rates, excreted urine of maximal specific gravity less than 1·012, whereas 16 of 18 patients (89%) with chronic pyelonephritis with a similar reduction of the glomerular filtration-rate excreted urine of so low a specific gravity. This difference explains why patients with advanced chronic pyelonephritis had more severe polyuria than had patients with chronic glomerulonephritis. In pyelonephritis the polyuria can be severe enough to lead to the erroneous diagnosis of diabetes insipidus.

In applying the ability to concentrate the urine to the assessment of the extent of the renal lesion one must not forget that, owing to the irregularity of spread of pyelonephritis, the specific gravity of the urine is that of a mixture of urine from damaged or destroyed nephrons with urine from relatively intact tubules. Thus, a specific gravity of 1·020 can be the result of either moderately severe pyelonephritis of both kidneys or of a mixture of highly concentrated urine from one healthy kidney and of isosthenuric urine from the other kidney; but, when the specific gravity indicates isosthenuria, it means that there is widespread damage of both kidneys.

A urinary specific gravity below that of plasma ultrafiltrate shows that, even with the most severe damage to their cells, the tubules can still absorb some electrolytes from the urine. This is further shown by the result of the dilution test (fig. 10). Though the ability to concentrate the urine is impaired in practically all cases of pyelonephritis (in some to a very considerable extent), the ability to dilute the urine to a specific gravity of at least 1·002 remains, with few exceptions, up to the last stages of the disease. Like the concentration of the urine, the dilution of it is connected with the formation of an osmotic gradient between the blood and the urine in the tubules. Fig. 10 suggests that dilution and concentration cannot be viewed simply as two aspects of one and the same process, and that, of the two functions, concentration is much more vulnerable than dilution. The reason for this difference is unknown.

The rôle of the distal tubules in regulating the acid-base balance has so far been but little studied in disease and not at all in chronic pyelonephritis, where an alteration of this function may be expected. V. Fencl (unpublished work) therefore investigated in our laboratory the ability of our pyelonephritics to save base after the administration of ammonium chloride 5 g. daily for two days. In his preliminary studies he examined the twelve-hour urine of the second night for ammonium and titratable acidity—i.e., sodium ions exchanged in the distal tubules and used to replenish the alkaline reserve.

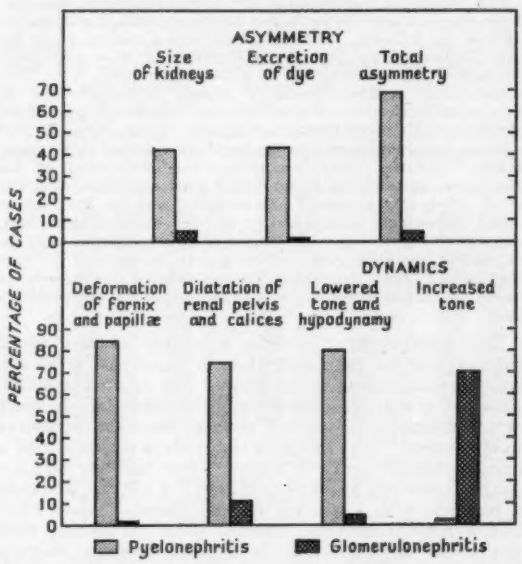

Fig. 16—Radiological findings in 96 cases of chronic pyelonephritis (stippled) and 53 of chronic glomerulonephritis (cross-hatched).

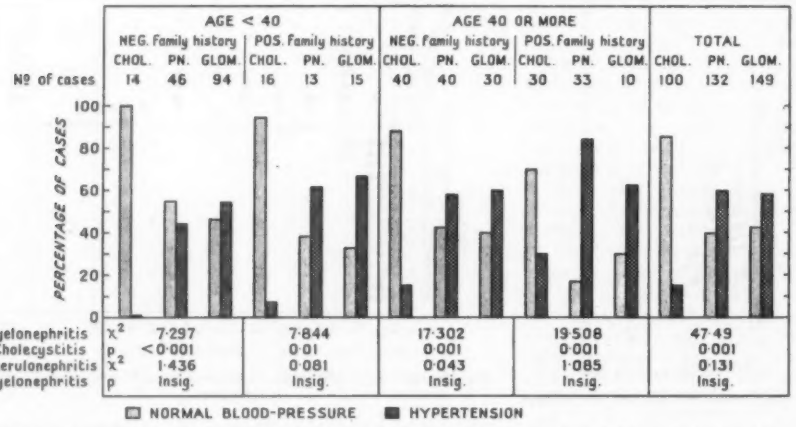

Fig. 17—Incidence of hypertension in chronic pyelonephritis, chronic glomerulonephritis, and cholecystitis.

A healthy man excretes in twelve hours 90 m.eq. of hydrogen and ammonium (fig. 11). The same quantity of fixed base is saved to the body. 11·5% of this saved base is accounted for by titratable acidity, and 88·5% by ammonia. In chronic pyelonephritis with a mild reduction of function of the distal tubules (urinary specific gravity above 1·020) a slight restriction of this process may occasionally be found; but in patients with a urinary specific gravity less than 1·020 the efficiency of the whole exchange mechanism drops to about half, primarily owing to deficient production of ammonia. This follows from the fact that the proportion of saved base accounted for by titratable acidity increases to 17·4%. The hydrogen exchange is, however, limited by the concentration of hydrogen ions in the urine excreted by the tubules. Hence a consequence of this reduction of the ability to excrete ammonia is the loss of fixed base which accompanies radicals of stronger acids in the urine. This permanent loss of sodium from the body tends to produce dehydration, especially if a salt-free diet is inadvertently prescribed for the patient.

The failure of the tubules to excrete hydrogen into the urine may increase the hydrogen-ion concentration within the cells of the tubules. This would initiate a vicious circle by still further depressing the production of ammonia from glutamine, the optimal pH of glutaminase being 7·8. The intracellular acidosis probably causes increased loss of potassium from cells of the tubules. Although potassium enters into the base-saving mechanism in the urine in the tubules, being exchanged partly for sodium bound by stronger anions, its losses further complicate the disturbance of the electrolyte metabolism in advanced pyelonephritis. On the other hand, this increased loss explains why we have never found potassium accumulating in the extracellular fluid, even in the most advanced stages of pyelonephritis with an extremely low glomerular filtration-rate, in spite of the fact that under these conditions the accelerated breakdown of tissue proteins releases much potassium into the extracellular fluid.

The restriction of sodium exchange in the distal tubules and the permanent loss of fixed base from the body decrease the alkaline reserve and produce acidosis. There is a very good correlation between the decrease of concentrating power and that of the alkaline reserve to low values. Fig. 12 shows that only 4 patients with a urinary specific gravity above 1·020 had an alkaline reserve below our lower normal limit (53 vol. %), and only 4 patients with a urinary specific gravity below 1·020 had a normal alkaline reserve. The correlation with glomerular filtration-rate is slightly less satisfactory ($P = 0·496$). However, all the patients in whom this function was severely reduced were acidotic. No doubt, in these patients there was a very severe lesion of the tubules and katabolism exceeded anabolism.

Calcium and Phosphorus Metabolism

Chronic acidosis is usually connected with disturbances of calcium and phosphorus metabolism: a fall in the plasma-phosphate level, whereas the plasma-calcium level is normal or slightly below normal, provided the glomerular filtration-rate is normal. Fig. 13 shows that this was not what happened in our pyelonephritics. We found changes in the ratio of plasma-calcium and plasma-phosphorus levels in only the most advanced cases with a urinary specific gravity below 1·013. These changes, however, consisted in a rise in the plasma-phosphate level and a fall in the plasma-calcium level.

Simple parathyroid hyperfunction as a consequence of increased urinary excretion of calcium in these acidotic patients was clearly an inadequate explanation. Analysis revealed that the rise in the plasma-phosphate level was the primary event. This was obviously a consequence of the much reduced filtered load of phosphate; even the greatest possible increase of parathyroid secretion in these patients who were chronically losing calcium in their urine and a great reduction of the power of the tubules to reabsorb phosphate were insufficient to restore their plasma-phosphate level to normal. Probably the plasma-calcium level dropped partly as a consequence of its increased urinary excretion in acidosis. This excretion, however, was not significant enough to produce detectable osteoporosis. Although the amount of alkaline phosphatase was slightly increased in the patients in this last group, no significant demineralisation of the bone, or cyst formation, was found on radiography in any of our patients with a far advanced renal lesion. Biopsy specimens of bone obtained in some of our patients during lumbotomy did not reveal any changes in the structure of bone.

Ureteric Catheterisation

I have been dealing so far with the effect of interstitial renal inflammation on the function of the neighbouring

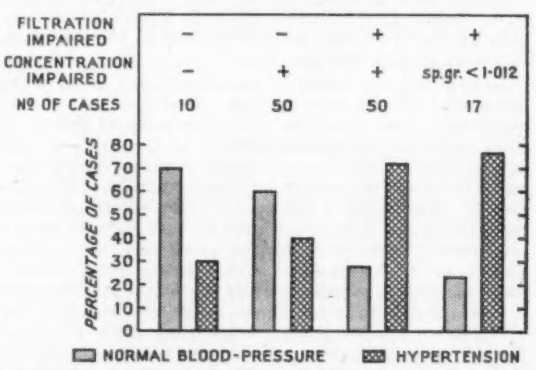

Fig. 18—Correlation of incidence of hypertension and changes in renal function.

nephrons. I have already emphasised that chronic pyelonephritis spreads irregularly, and that there are usually great differences in its extent in the two kidneys. I therefore tried to assess the function of the two kidneys separately. After much futile effort, we decided to make do with a study of separate concentrating indices of endogenous creatinine ($\frac{U}{P}$ ratios) in the urine obtained from the two kidneys by ureteric catheterisation. The results of this study, made by my collaborator Prát (1955), are shown in fig. 14, where the differences in the $\frac{U}{P}$ ratios of the two kidneys are expressed as percentages of whichever ratio was the lower. This difference was insignificant in 13 healthy people (6·0%), in 13 patients with chronic glomerulonephritis (3·6%), and in 7 with vascular nephrosclerosis (5·9%); whereas in 31 patients with chronic pyelonephritis the average difference was 78·3% for the whole group, being 123·6% in those in whom there were other reasons to suspect unilateral disease, and 53·5% in those in whom no difference between the two kidneys was indicated on other grounds. The diagnostic importance of this finding is clear, especially since the data for the individual cases (fig. 15) show very little overlapping.

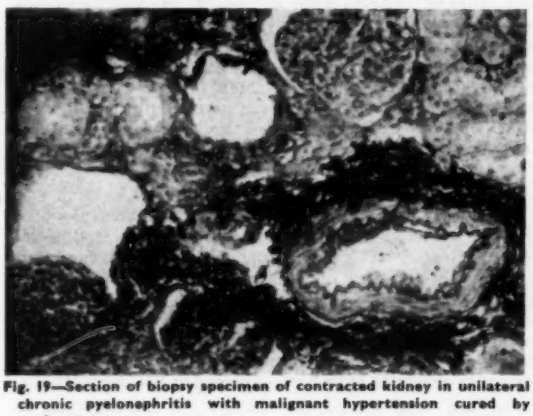

Fig. 19—Section of biopsy specimen of contracted kidney in unilateral chronic pyelonephritis with malignant hypertension cured by nephrectomy.

Radiography

There has been much controversy about the usefulness of radiography in establishing the diagnosis of chronic pyelonephritis. Radiography is, of course, necessary to show anatomical abnormalities of the urinary tract; but it has been doubted whether it can afford further information about the state of the kidneys.

Improved methods of diagnosing pyelonephritis enabled my colleague Dejdar (1955) to reinvestigate this question. The result was rather surprising: of 96 patients in whom chronic pyelonephritis was diagnosed on clinical grounds it was possible to demonstrate in 70% an asymmetry between the two kidneys. This was shown by the size and density of the renal shadow and by the speed at which the dye appeared in the renal pelves (fig. 16). In the control group of 21 glomerulonephritics such an asymmetry was found in only 4%. Further, when serial radiographs were taken in the first few minutes after the injection of dye to gain some idea of the function of calices, pelvis, and ureter, and attention was paid to residues of the dye in the pelvis and calices fifteen to thirty minutes later, a failure of proper contraction and evacuation of the dye—either hypotony or atony—was discovered in 80%. A hypotonic urinary tract was found not only in patients with a primary lesion in the urinary tract but also in patients with primary pyelonephritis. This discovery supports the view expressed above that a functional disturbance of the urinary tract without any anatomical obstruction may facilitate infection and its further spread to the kidneys. This was in sharp contrast to the findings in glomerulonephritics, such changes being found in only 3·7% of such patients, and being neither severe nor widespread. On the other hand, spastic calices were found in 69·9% of the glomerulonephritics but in only 1% of the pyelonephritics, in whom they were unilateral, whereas in glomerulonephritics they were bilateral.

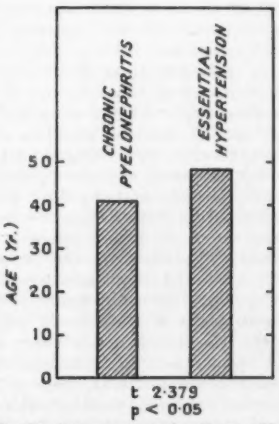

Fig. 20—Average ages of patients with malignant hypertension.

Hypertension

Our progress in the clinical diagnosis of chronic pyelonephritis shed more light on hypertension in chronic pyelonephritis. Investigators in this field are divided into several groups: most of them seem to accept that hypertension is present, at least in the late stages; but opponents of this view—e.g., Bell (1950)—do not acknowledge any link between pyelonephritis and hypertension. Goldring and Chasis (1944), who deny such a connection, at least in unilateral pyelonephritis, maintain that hypertension is then coincidental. Schroeder and Steele (1941) hold the extreme view that chronic pyelonephritis underlies most cases of essential hypertension, their conclusion being based on minor abnormalities in the pyelograms.

We therefore compared the prevalence of hypertension (blood-pressure over 145/95 mm. Hg, special attention being paid to the diastolic pressure) in our 132 pyelonephritics and in 100 patients with chronic cholecystitis selected at random (fig. 17). The controls were selected from patients because of our previous finding that any organic disease might disturb the vasomotor mechanisms (Brod et al. 1954). We also studied hypertension in glomerulonephritis.

The average age of our patients with cholecystitis was somewhat higher than that of those with pyelonephritis,

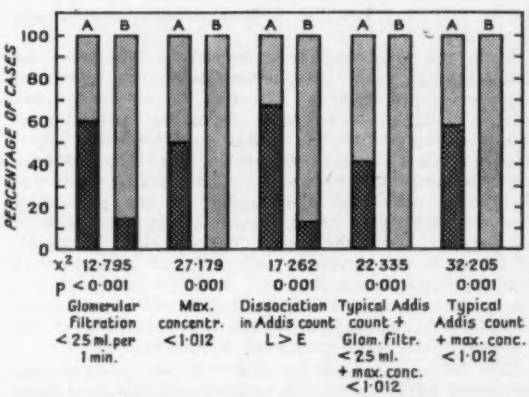

Fig. 21—Renal function in malignant hypertension due to chronic pyelonephritis (A) and in essential hypertension (B).

but it is clear that hypertension was four times as common among our pyelonephritics as in the controls: 59·7% compared with 15·0%.

In patients aged more than 40 and with a family background of hypertension the prevalence was 84·85% in pyelonephritis and only 30% in cholecystitis. Here we cannot deny a possible coincidence with essential hypertension, 85% being almost the sum of the prevalence of hypertension in older pyelonephritics with a negative family history and the 30% prevalence in patients with cholecystitis with a positive family background. However, even in young patients with a negative family history hypertension was present in 43·5%, whereas it was not found in any control patient of the corresponding subgroup. The difference between pyelonephritis and cholecystitis is statistically highly significant.

On the other hand, there is no difference between the prevalence of hypertension in pyelonephritis and glomerulonephritis in any of the subgroups, and the over-all prevalences of hypertension in pyelonephritis and in glomerulonephritis are almost equal, that in glomerulonephritis being 58·1%, indicating that the blood-pressure is raised by the same mechanism in both diseases.

Hypertension develops with increasing frequency as pyelonephritis progresses; but hypertension was found in 14 (43·8%) of 32 patients with a normal glomerular filtration-rate and in more than 20% of patients in whom all renal functions were only a little damaged (fig. 18). Thus there can be no reasonable doubt about the causal relationship between chronic pyelonephritis and hypertension, which can be brought about even by slight disease.

As regards the mechanism by which hypertension develops one can but speculate; but our biopsy studies (Brod and Benešová 1955) refute the theory of Weiss and Parker (1939) that arteritis induced in renal vessels by the surrounding inflammation may be the starting-point: in 5 of our patients with grave hypertension such lesions were either absent (fig. 19) or minimal, and in 3 patients with hypertension vascular changes were of the type found in experimental hypertension.

A very important complication of pyelonephritic hypertension is malignant hypertension, diagnosed on changes in the retinæ. Of 76 pyelonephritics with hypertension this complication developed in 15 (19·7%). This was significantly more than the 10% prevalence of malignant hypertension in our 490 patients with essential hypertension. There was, however, no significant difference in the prevalence of severe diastolic hypertension (above 130 mm. Hg) between chronic pyelonephritis and essential hypertension. Malignant hypertension came on at an earlier average age (41·67 yr.) in chronic pyelonephritis than in essential hypertension (48·59 yr.) (fig. 20), the difference being statistically significant.

From the renal aspect an important difference was found between these two diseases as regards malignant hypertension: whereas essential hypertension can become malignant at any level of glomerular filtration or concentrating ability, in chronic pyelonephritis hypertension tends to become malignant only with far advanced renal disease. The difference is statistically significant ($P<0·05$). Whereas a reduction of the glomerular filtration-rate below 25 ml. a minute was found in 60% of patients with malignant hypertension in pyelonephritis, it was found in only 10% of patients with essential hypertension (fig. 21). Inability to concentrate the urine to sp. gr. 1·012 was not found in malignant hypertension per se, but it was found in 50% of our pyelonephritics with malignant hypertension.

The Addis count further differentiates patients with malignant hypertension due to pyelonephritis from those with malignant hypertension following essential hypertension: the typical prevalence of leucocytes in the urinary deposit was found in almost 65% of the pyelonephritics but in only 10% of the patients with essential hypertension. Therefore a combination of a glomerular filtration-rate below 25 ml. a minute, inability to concentrate the urine to sp. gr. 1·012, and a majority of leucocytes in the Addis count are pathognomonic of malignant hypertension due to chronic pyelonephritis.

A combination of a low urinary specific gravity and Addis count gives an equally sharp differentiation between the two diseases. The diagnosis thus established was confirmed by either biopsy or necropsy in most of the later cases.

Clinical Entity of Chronic Pyelonephritis

In most of the patients included in this study the clinical diagnosis of chronic pyelonephritis was based (apart from the history) on the dissociation between the disturbances of glomerular and tubular functions and the dissociation between leucocytes and erythrocytes in the Addis count. New criteria were added only slowly as our experience of chronic pyelonephritis increased, and our present knowledge comes only from the analysis of the whole group. Is it, therefore, possible that we have collected an artificial group which, although presenting this double dissociation, is really of heterogeneous pathology? I think that this question can be answered in the negative. Not only was our diagnosis confirmed by the pathologist wherever possible, but also the alterations in almost all the functions which have been discussed separate our group of chronic pyelonephritis sharply from the other renal diseases and reveal a uniform behaviour within the group.

Treatment

Little advance has been made in the treatment of chronic pyelonephritis. Chemotherapy and antibiotics are insufficient. The chief difficulty lies in the fact that a kidney which has once been damaged is a locus of predilection for any blood-borne organisms, and that an abnormally functioning urinary tract predisposes to infection of the renal pelves. We can do little towards functional restitution of the pelves once their elastic and muscular elements have been superseded by fibrous tissue.

Our not very satisfactory therapeutic regimen can be summarised as follows:

(1) Prevention of disturbance of the urinary tract and intensive treatment of such disturbance.

(2) Prevention of infection and careful elimination of all focal infection in a patient in whom the function of the urinary tract is disturbed, and intensive treatment of every infection in the urinary tract.

(3) Antibiotic therapy strengthened, if possible, by regulating the reaction of the urine.

(4) Care of the bowels, with proper hygiene of the abdominal wall.

(5) Sexual hygiene.

(6) Saving of osmotic work of the diseased tubules by the dietetic principles of Addis.

(7) Salt restriction never to be prescribed unless there is some special reason for it—e.g., heart-failure.

(8) Possibly treatment in a sanatorium, to improve the patient's general condition and his resistance to infection.

(9) Renal denervation or an attempt to remove sclerosed fat from the renal hilus in progressive cases.

(10) Where unilateral disease leads to hypertension (especially the malignant sort), nephrectomy to be considered.

With such purposeful treatment we have occasionally seen striking results. In several cases malignant hypertension was made to recede, and in 1 case nephrectomy completely cured malignant hypertension; but such striking successes have hitherto been the exception rather than the rule. Too many patients are still referred to us with irreversible changes of the urinary tract, terminal changes in the kidneys, or a seriously damaged cardiovascular system. It is possible today to recognise chronic pyelonephritis even in its earliest stage by methods which

are at the disposal of even small hospitals. Our future tasks are to look for methods of treating functional disturbances of the urinary tract and to prevent this dangerous and common disease. This will be possible only after we have thoroughly recognised its cause; and this, especially in the primary form, still awaits a solution.

I thank Dr. D. Benešová for the photomicrographs used in figs. 1 and 19.

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IDIOPATHIC HYPERCALCÆMIA OF INFANCY

CLINICAL AND METABOLIC STUDIES WITH SPECIAL REFERENCE TO THE ÆTIOLOGICAL RÔLE OF VITAMIN D

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"Idiopathic hypercalcæmia . . . Is this the price we pay for the abolition of rickets?"—*Lancet*, 1954, ii, 128.

"In spite of the knowledge of the preventive action of vitamin D, and also of ultraviolet light, rickets remains in the Baltimore community an extremely common disease."—E. A. Park (1953).

Two types of infantile hypercalcæmia have been recognised: one with mental defect, often other congenital abnormalities, a long course, and a poor prognosis; and the other with no associated congenital defects, a shorter course, and usually a better prognosis (Schlesinger et al. 1956). Most of the published cases have been of the latter type, and it is with this type that we deal here.

Ætiology

Creery (1953) suggested that alkali therapy might be a contributory cause. Lowe et al. (1954) concluded, from a renal biopsy, that primary renal disease was probably not responsible. They and others also dismissed primary parathyroid overactivity as a cause. Idiopathic hypercalcæmia has not been reported in a wholly breast-fed infant, and this has been related to the fact that the calcium content of breast-milk is about a quarter of that of cow's milk (Creery and Neill 1954). The high phosphorus content of cow's milk is, however, held responsible for neonatal hypocalcæmia by other workers (Gardner et al. 1950).

An abnormal sensitivity to normal doses of vitamin D has been suggested by Lightwood (1953) as the cause. Such sensitivity and an excessive intake of vitamin D were considered as likely ætiological factors by Lowe et al. (1954) and Creery and Neill (1954). Bonham Carter et al. (1955) gave calciferol 10,000 units daily for eleven days to a child with idiopathic hypercalcæmia and, from the coincident clinical deterioration, concluded that there was an abnormal sensitivity to vitamin D. The implication of these suggestions has led the British Pædiatric Association, at the instigation of the Ministry of Health, to conduct a national inquiry into the possible relationship between the intake of vitamin D and the development of idiopathic hypercalcæmia of infancy.

Certain objections can be raised against the concept of vitamin-D overdosage or hypersensitivity. Very large doses of vitamin D have been tolerated in infancy without toxic effects; and Wolf (1943) concludes that there is a very wide margin of safety between optimal and toxic dosage.

Creery and Neill (1954) state that 2 of their patients with idiopathic hypercalcæmia had had no supplement of vitamin D and a total intake of only 700 units of it daily. They gave, in one of their active cases, 2000 units of calciferol daily for three and a half weeks and obtained a steady clinical improvement despite a transient rise in the serum-calcium level.

Idiopathic hypercalcæmia has apparently not been reported from the United States of America (*Quarterly Review of Pediatrics* 1955).

An association has been reported between hypercalcæmia and interstitial plasma-cell pneumonia (Hallman et al. 1954). This latter disease has only recently been recognised in this country (Baar 1955). During its acute phase the serum-calcium level often rises, and in a few cases a raised serum-calcium level persists for weeks after the child has recovered.

Case-reports

The present study is based on 5 cases of idiopathic hypercalcæmia and a possible 6th case observed during 1951–56. The main clinical and biochemical findings and progress are given in tables I and II and figs. 1–5.

TABLE I—SUMMARIES OF CASE-HISTORIES

Case no.	Age at onset (mos.)	Age when diagnosed (mos.)	Duration of illness (mos.)	Follow-up
1	3	7	7	Æt. 3½ yr.: wt. 39 lb., ht. 41 in., normal intelligence and activity, serum-Ca 12·0 mg. per 100 ml., plasma-cholesterol 185 mg. per 100 ml.
2	10	13	9	Æt. 3 yr.: wt. 27 lb., ht. 33½ in., normal intelligence and activity, serum-Ca 10·4 mg. per 100 ml., plasma-cholesterol 167 mg. per 100 ml.
3	6½	8	10	Æt. 2 yr.: wt. 26 lb., ht. 33 in., normal intelligence and activity, serum-Ca 10·4 mg. per 100 ml., plasma-cholesterol 197 mg. per 100 ml.
4	4	8	8	Æt. 2 yr.: wt. 22 lb., ht. 33 in., normal intelligence and activity, serum-Ca 10·2 mg. per 100 ml., plasma-cholesterol 229 mg. per 100 ml.
5	10	10½	1½	Æt. 2 yr.: wt. 26 lb., ht. 33 in., normal intelligence and activity, serum-Ca 10·0 mg. per 100 ml., plasma-cholesterol 194 mg. per 100 ml.
6	5	7	3+	..

TABLE II—BIOCHEMICAL FINDINGS

Case no.	Serum-calcium (mg. per 100 ml.)	Serum-alkaline-phosphatase (K.-A. units)	Serum-phosphorus (mg. per 100 ml.)	Plasma-cholesterol (mg. per 100 ml.)	Blood-urea nitrogen (mg. per 100 ml.)	CO_2-combining power (vol. %)	Urine	Serum-proteins (mg. per 100 ml.)
1	11·3–15·4	8	2·4–5·0	..	20–30	54–61	Acid	6·90–7·00
2	10·7–16·4	10–11	5·0	212–283	7–44	26–44	Acid, no amino-aciduria	7·25 *
3	9·6–15·6	8–15	4·2–6·7	156–306	13–18	54	Acid, no amino-aciduria	6·15–6·25 *
4	10·2–16·2	10–16	2·6–6·0	145–262	30–44	45	Acid, no amino-aciduria	7·05–7·34 *
5	10·7–11·2	..	6·5	263	14	46	Acid	..
6	9·8–13·6	14	5·2	158–249	24	55	Acid	7·10–7·60 †

* Normal electrophoretic pattern. † Increase in α^2 and β globulin.

Case 1.—Male: birth-weight 9 lb. 1 oz. Breast-fed for eight weeks, then given National dried milk (N.D.M.) without additional vitamin supplement. Normal progress for three months but thereafter vomited, lost weight, and became pale, anorexic, listless, and constipated.

Admitted to hospital æt. 5 mos. Continued to vomit and required subcutaneous saline solution frequently. Very ill when serum-calcium level first estimated (12·7 mg. per 100 ml.). Improved two weeks later, when serum-calcium level had risen to 15·2 mg. per 100 ml. Radiography showed increased peripheral density of metacarpal, tarsal, and metatarsal bones.

Diet in hospital predominantly cow's milk except for period of low-calcium diet (meat purée and sweetened fruit juice). No clinical improvement during latter diet although serum-calcium level fell (fig. 1).

Ultimately recovered satisfactorily, and three years later height and weight were well above normal for his age and at the 90th percentile of the values given by Mitchell-Nelson (1950) for healthy children.

Case 2.—Girl: birth-weight 7 lb. 13 oz. Breast-fed for two weeks, then given N.D.M. until weaned at one year. Half a teaspoonful of cod-liver oil daily until 3 mos. old, thereafter no vitamin supplement until after onset of symptoms. When 10 mos. old vomiting, anorexia, constipation, loss of weight, pallor, and listlessness developed.

Admitted to hospital æt. 14 mos., underweight. Characteristic radiological bone changes present. Temporary spontaneous initial improvement followed by a relapse.

Low-calcium diet (as for case 1) given for three weeks. Serum-calcium level fell and clinical improvement took place and continued after reintroduction of a milk diet, although the serum-calcium level rose to 16·1 mg. per 100 ml. (fig. 2).

Discharged home after five months in hospital. At the age of 3 years was considerably below the expected weight and height, at the 10th percentile and below the 3rd percentile respectively of the values given by Mitchell-Nelson (1950).

Case 3.—Male: identical twin of case 5. Birth-weight 7 lb. Breast-fed for a month, then cow's milk. Given cod-liver oil a few drops a day in the early weeks, increasing progressively to a teaspoonful at 6 mos., when all vitamin supplements were stopped.

At 3 mos. developed a respiratory infection treated with penicillin. At $6^1/_2$ mos. began to vomit and shortly thereafter developed an acute episode of vomiting and diarrhœa, which lasted five days. Vomiting continued, and he gradually became constipated, pale, and apathetic.

Admitted to hospital æt. 8 mos., underweight and with continuing symptoms. Some increased density of femoral metaphyses and periphery of tarsal bones.

Began to recover after six weeks in hospital (fig. 3): discharged after four months. A year later below expected weight and height, at the 25th and the 10th percentile respectively (Mitchell-Nelson 1950).

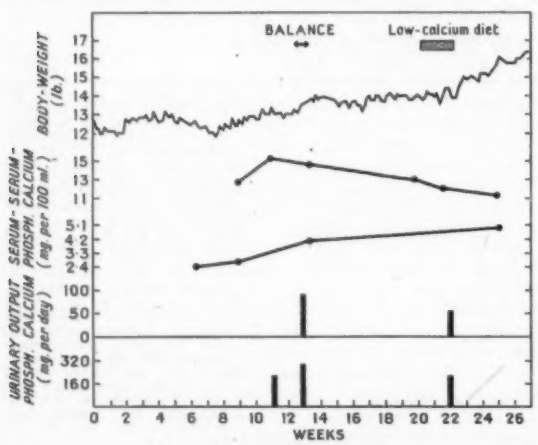

Fig. 1—Progress chart of case 1.

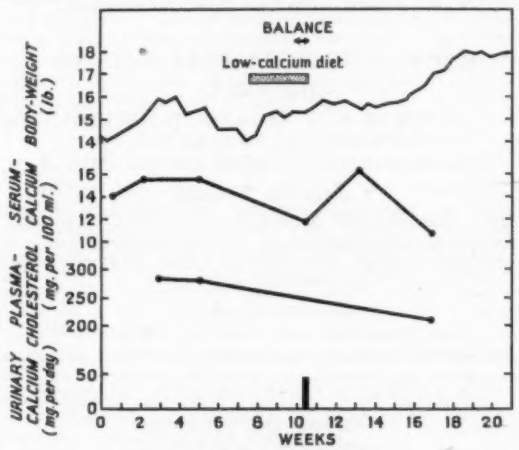

Fig. 2—Progress chart of case 2.

Case 4.—Male: birth-weight 8 lb. 2 oz. Fed on 'Cow & Gate' dried milk with no additional vitamin supplement. At 4 mos. began to vomit, to be slow in feeding, and to be constipated. Coincidentally cough developed, which persisted three months.

Admitted to hospital æt. 8 mos., pale, underweight, hypotonic, with abdominal fæcal masses and radiological bone changes of idiopathic hypercalcæmia.

In hospital for five and a half months (fig. 4).

At the age of 2 years very much underweight and underheight, at the 3rd percentiles (Mitchell-Nelson 1950).

Case 5.—Identical twin of case 3. Birth-weight 5 lb. Breast-fed for five weeks, then cow's milk. Given cod-liver oil a few drops a day in the early weeks, increasing to a teaspoonful at 6 mos. and remaining at that amount. At 6 mos. respiratory infection developed. At 9 mos. given a ten-day course of ultraviolet light. At 10 mos. vomiting, anorexia, and loss of weight developed, with initially a four-day episode of diarrhœa, then constipation.

Admitted to hospital a fortnight after onset of symptoms. Began to recover after three weeks.

This child's illness was very similar in onset and symptoms to that of his twin. His mother and the family doctor considered the illnesses to be the same. The

plasma-cholesterol level as with his brother was raised. It appears quite likely that he had the same disease as his brother but presenting in a milder form.

The criteria of identical twinning were as follows: they looked alike; the blood-groups, including A B O, Rh phenotype, and probable genotype, M N S and P, Lutheran, Kell, Lewis a and b, and Duffy, were identical; blood from both parents and the four other siblings examined in the same way showed that the probability of uniovularity was at least 98·7%, calculated by the method of Race and Sanger (1954). The finger-prints, according to the criteria of Cummins and Midlo (1943) were compatible.

Case 6.—Girl: birth-weight 8 lb. 12 oz. Breast-fed for two months, then Cow & Gate milk. Half a teaspoonful of cod-liver oil at 2 mos., increasing to 1 teaspoonful at $3^1/_2$ mos. and remaining at that level. 'Farex' at $4^1/_2$ mos. Given 'Glucose D' (1 or 2 teaspoonfuls daily) from 3 mos. onwards. At $5^1/_2$ mos. cough (which lasted a month), vomiting and constipation, loss of weight, and anorexia developed.

Admitted to hospital at 7 mos. (fig. 5). Palpable fæcal masses, hypotonia, and suggestive radiological changes in bones.

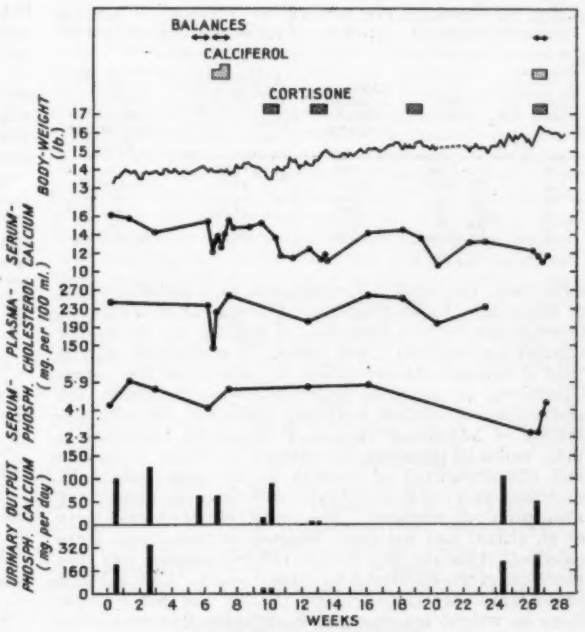

Fig. 4—Progress chart of case 4.

Method

The balance periods lasted five to eight days except for the three-day balance on a low-calcium diet. With milk feeding an aliquot from each day's feed was kept and analysed. Where a mixed diet was being given each feed was duplicated and the pooled duplicates for the day analysed. Apart from case 1 when re-examined at the age of $3^1/_2$ years and case 2 when on a low-calcium diet, the balance diet consisted of cow's milk with additional cornflour and arrow-root occasionally. All the infants had been on the balance diet for at least four days before the balance studies were begun, and, except in case 6, no vitamin supplements had been given for several weeks or months previously. Urine and fæces were collected daily by the methods described by Forfar and Prain (1950). Specimens for the estimation of daily urinary excretion of calcium and phosphorus were usually collected over several consecutive days.

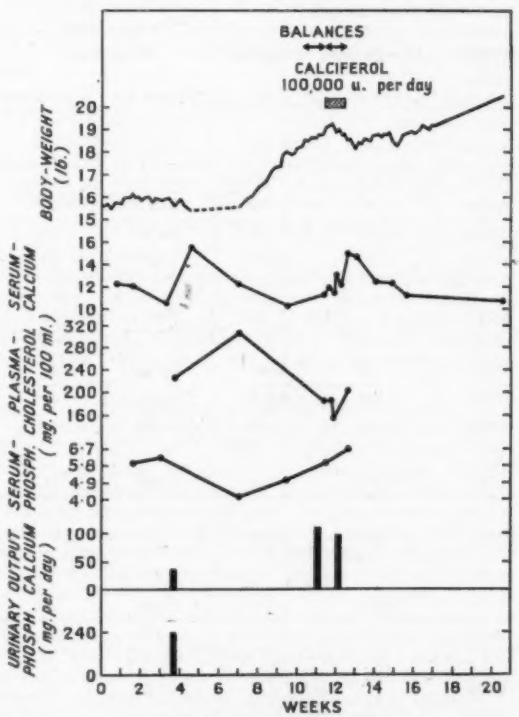

Fig. 3—Progress chart of case 3.

Standard biochemical methods were used. Fæces and diet were emulsified with water to a convenient volume in an 'Ato-mixer,' and an aliquot was examined.

Intake of Vitamin D and Effect of Calciferol

The approximate intake of vitamin D in these cases and the form in which it was predominantly administered are shown in table III. The figures are calculated on the assumption that a teaspoonful of cod-liver oil contains 700 units of vitamin D, a level scoopful of National dried milk powder 40 units, of proprietary milk powder 45 units, and cereals the amounts stated by the manufacturers.

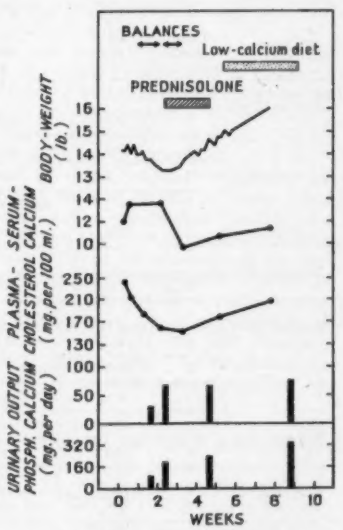

Fig. 5—Progress chart of case 6.

Since cases 3, 5, and (to a lesser extent) 1 had had low intakes of vitamin D, it was felt that this vitamin might

TABLE III—APPROXIMATE INTAKE OF VITAMIN D BEFORE ONSET OF SYMPTOMS, AND TYPE OF VITAMIN D ADMINISTERED

Case no.	Range (units)	Average daily intake (units)	Average daily intake for a month before onset of symptoms (units)	Form in which vitamin D was predominantly given
1	45–1300	550	1250	D_2
2	30–2000	1350	1950	D_2 and D_3
3	30–750	400	400	D_3
4	750–1500	1200	1450	D_3
5	20–760	570	750	D_3
6	33–2500	1240	2300	D_2 and D_3

have been too readily incriminated as a possible cause of idiopathic hypercalcæmia. Vitamin D is stated to increase the urinary excretion of calcium by decreasing tubular reabsorption (Dent 1954). It is generally agreed that it favours the deposition of calcium in the bones. Therefore, in infantile hypercalcæmia, in which the metabolism of calcium is already disturbed, the administration of additional vitamin D might be beneficial in that, under its influence, the urinary excretion of calcium and the deposition of calcium in the bones might be increased at a relatively greater rate than the alimentary absorption of calcium. The work of Bonham Carter et al. (1955) had not been reported at this time. Pure calciferol (vitamin D_2) 50,000–100,000 units a day was therefore given by mouth to cases 3 and 4. Case 3 had a slight temporary loss of weight (fig. 3), but such fluctuations in weight are common in infantile hypercalcæmia (figs. 1 and 2) and this fall may have been fortuitous. The serum-calcium level rose by 3·5 mg. per 100 ml. but quickly fell again—a similar effect to that reported by Creery and Neill (1954). The level reached, however, was lower than that which had previously been reached spontaneously. Otherwise no beneficial or adverse effects were noted either during therapy or during the following eight months. In case 4 there was no clinical change during or after calciferol therapy. The serum-calcium level fell by 3·1 mg. per 100 ml. and returned to its previous height the day after calciferol was discontinued. Comparable normal controls given the same dosage of calciferol showed rises of 1·2 and 0·7 mg. per 100 ml. in 2 cases and a fall of 1·0 mg. per 100 ml. in 1 other.

Calciferol was also given to case 1, who had been free from symptoms, had had no vitamin-D supplement for more than two years, and had a normal serum-calcium level. Again neither immediate nor long-term effects were noted. There was no change in the serum-calcium level. The biological activity of the batch of calciferol used was proved by curing a case of active rickets with it.

Calcium-balance Studies

The nature of the balances, the stage of the disease at which they were studied, and the results are shown in table IV.

Unrestricted Diet: No Vitamin-D Supplement or Vitamin-D-fortified Milk

The retention of calcium was 31%, 48%, and 69% in the active cases, 16% in the recovering case, and 16% in the cured case.

A very wide range of retention of calcium has been found in healthy infants on a milk diet. From the work of Hoobler (1911), Telfer (1922), Daniels and Stearns (1925), Flood (1926), Stearns (1933), Jeans et al. (1936), and Harrison (1936) we have obtained the results of 24 calcium balances studied in healthy infants aged 7–12 months and fed on a cow's-milk diet or an evaporated-milk diet with, so far as can be ascertained, a normal intake of vitamin D. On an average intake of 1·17 g. of calcium daily the mean retention of calcium was 32% or 0·38 g. (range 0–79%) which agrees very closely with the daily

TABLE IV—CALCIUM AND PHOSPHORUS BALANCES

Balance	Case no.	Age (yr.)	Clinical state	Duration of balance (days)	Average daily intake (g.)	Average daily output (g.)		Retention	
						Fæces	Urine	Amount (g.)	% of intake
Calcium:									
Normal diet:	1	8/12	Active	5	1·500	0·940	0·090	0·470	31
	4	9/12	Active	7	0·896	0·404	0·063	0·429	48
	6	7/12	Active	8	0·658	0·183	0·030	0·445	69
	3	10/12	Early recovery	7	1·096	0·811	0·109	0·176	16
	1	3½	Inactive	7	0·772	0·567	0·079	0·126	16
Normal diet plus prednisolone 5 mg. daily:	6	7/12	Active	6	0·793	0·426		0·367	46
Normal diet plus calciferol 100,000 units daily:	4 *	9/12	Active	7	0·892	0·180	0·063	0·649	73
	3	11/12	Early recovery	7	0·997	0·500	0·096	0·401	40
	1	3½	Inactive	7	0·692	0·220	0·183	0·289	42
Normal diet plus calciferol 100,000 units and cortisone 25 mg. daily:	4	13/12	Active	6	1·135	0·807	0·048	0·280	25
Low-calcium diet: no vitamin supplement:	2	1½	Active	3	0·035	0·135	0·054	Net loss 0·154	
Phosphorus:									
Normal diet:	1	8/12	Active	5	1·500	0·600	0·300	0·600	40
	6	7/12	Active	6	0·319	0·056	0·083	0·180	56
Normal diet plus prednisolone 5 mg. daily:	6	7/12	Active	6	0·412	0·248		0·164	40

* Calciferol 50,000 units daily for first 3½ days of balance.

retention of calcium in a similar age-group reported by Sherman and Hawley (1922) from their study of German published reports, and with the calculated requirement of the body at this age (Leitch 1937).

In our 3 active cases the mean intake of calcium was 1·02 g. a day and the mean retention 49% (0·45 g.) a day.

In view of the wide range of retention in healthy infants and even in the same infant, of the anorexia, vomiting, and constipation which make balance studies in idiopathic hypercalcæmia difficult, and of the variety of other factors which can influence the retention of calcium, individual calcium balances or small series of balances must obviously be interpreted with caution. We feel, however, that the retention of calcium in these cases, especially when considered along with the increased urinary excretion of calcium, the raised serum-calcium level, and the probably increased deposition of calcium in the bones, indicates increased absorption of calcium from the alimentary tract.

Unrestricted Diet with Additional Prednisolone

In case 6 this balance was studied in the early acute phase of the disease. Under the influence of prednisolone, 5 mg. a day, a positive calcium balance of 69%, with an average daily retention of 0·45 g., was converted to a balance of 46%, with an average retention of 0·37 g.

Unrestricted Diet with Additional Calciferol

The retention of calcium was increased in all the cases by calciferol—to 73% in the active case, 40% in the early recovery case, and 42% in the inactive case.

Houet (1946) gave a single dose of calciferol 600,000 units to a healthy infant, aged 6 months, whose retention of calcium just before the calciferol was given was 45%. Over consecutive ensuing three-day periods retentions of 67%, 47%, 70%, and 45% were observed. Previous deprivation of vitamin D also increases sensitivity (Houet 1946)—a relevant factor in our cases.

Thus calciferol caused no significant clinical change and did not appear to increase the retention of calcium to a greater degree than might have occurred in a healthy infant.

Unrestricted Diet with Additional Calciferol and Cortisone

In case 4 the balance was studied four months after the previous (calciferol) balance. The retention of calcium was 25%, which is considerably less than the retention on the same dosage of calciferol alone, and considerably less than the retention in the first study, when no calciferol supplement was given.

Low-calcium Diet

The infant had been on a low-calcium diet for eighteen days before the balance was studied. A negative calcium balance resulted and, as was found by Ferguson and McGowan (1954), Russell and Young (1954), and Bonham Carter et al. (1955), there was a fall in the serum-calcium level.

Urinary Excretion of Calcium

On a normal diet without added vitamin D the daily urinary excretion of calcium (eight estimations) was 30–127 mg. (mean 83 mg.). In healthy infants of the same age on about the same intake of calcium the range of eighteen estimations published by the workers already cited above was 8–55 mg. (mean 27 mg.) of urinary calcium a day. Knapp (1947) reported 3–86 mg. a day.

In idiopathic hypercalcæmia ranges of 23–122 (mean 69) mg. a day (Lowe et al. 1954), 40–67 (mean 53) mg. a day (Creery and Neill 1954), and 34–128 (mean 82) mg. a day (Bonham Carter et al. 1955) have been reported. Thus, although there is a wide individual and case-to-case variation, there appears to be little doubt that hypercalcuria occurs in idiopathic hypercalcæmia of infancy.

A feature of the present study is that (with the special exception of case 1 after recovery) calciferol in the dosage given did not increase the urinary output of calcium. Dent (1954) suggests that vitamin D reduces the tubular reabsorption of calcium, thus increasing its urinary excretion. Houet (1946) has shown that, in healthy infants, a dosage of calciferol comparable to that given to our patients slightly increases the urinary excretion of calcium. Accentuation of this effect might be expected in the presence of vitamin-D hypersensitivity. The failure of calciferol to increase further the hypercalcuria which was already present in the affected cases cannot be attributed to incapacity of the kidney to excrete more calcium, no matter how high the intake of calciferol might be, because in case 4, a month previously, spontaneous urinary outputs of calcium considerably in excess of that obtained with calciferol were observed (fig. 4).

Thus, although there is moderate hypercalcuria in idiopathic hypercalcæmia, there is no renal response to calciferol.

At the age of $3^1/_2$ years case 1 showed more than a twofold increase in the urinary output of calcium in response to calciferol. Clinically he had long since recovered from idiopathic hypercalcæmia, and his response to calciferol was probably normal and a function of his age rather than his disease. Knapp (1947) has shown that healthy infants excrete in their urine a smaller proportion of their intake of calcium than do older children and adults, and that it is about the age of 2 years that the adult pattern of excretion is attained.

Phosphorus Metabolism

Phosphorus balances were studied in cases 1 and 6 on normal milk diet during the active phase of hypercalcæmia (table IV). The retention of phosphorus was 40% and 56% respectively.

In 24 published phosphorus balances studied in healthy infants aged 7–12 months having, so far as can be ascertained, a normal intake of vitamin D (Blauberg 1911, Hoobler 1911, Telfer 1922, Daniels and Stearns 1925, Stearns 1933, Jeans et al. 1936, Harrison 1936) the mean intake of phosphorus was 0·89 g. a day, and the mean retention 23% (0·20 g.) a day.

In our 2 active cases the mean intake of phosphorus was 0·91 g. a day and the mean retention 43% (0·39 g.) a day. There thus appears to be an increased retention of phosphorus in idiopathic hypercalcæmia. Houet (1946) has shown that the effect of calciferol on infants is to reduce the retention of phosphorus somewhat.

Random estimations of daily urinary excretion of phosphorus on a milk diet without added vitamins were made on seven occasions. The range was 85–324 mg. (mean 229 mg.) a day. In the above-mentioned published balances the mean daily output of phosphorus in the urine was 437 mg. on a roughly comparable intake of phosphorus. In the cases of idiopathic hypercalcæmia there was thus a hypophosphaturia. In infancy calciferol normally causes hyperphosphaturia (Houet 1946, Fanconi and de Chastonay 1950), which might be expected in idiopathic hypercalcæmia if increased susceptibility to vitamin D were present.

Seventeen estimations of serum-phosphorus levels were made in these cases on a standard cow's-milk diet without added vitamin D. As observed by other workers, the levels fluctuated widely. The range was 2·4–6·3 mg. per 100 ml. (mean 4·9 mg. per 100 ml.) in contrast to the normal range of 4·5–5·7 mg. per 100 ml. (mean 5·4 mg. per 100 ml.) for children of this age (Bullock 1930). In hypervitaminosis D in infancy the serum-phosphorus level has been reported to be lowered (Fanconi and de Chastonay 1950) and to be raised (Jelke 1946, Ross 1952).

The serum-calcium and serum-phosphorus levels were estimated together on twenty occasions. The correlation coefficient was −0·08; thus no correlation between these could be demonstrated.

The serum-alkaline-phosphatase level tended to be low, as in vitamin-D intoxication (Fanconi and de Chastonay 1950).

Prednisolone, 5 mg. a day, converted a positive phosphorus balance of 59%, with an average daily retention of 0·18 g., to a balance of 40%, with a retention of 0·16 g.

Citrate Metabolism

Serum-citrate levels and urinary outputs of citrate were estimated in case 6 in the active phase and in cases 4 and 6 during recovery. In the active phase the serum-citrate level was 0·7 mg. per 100 ml., and during recovery 1·8, 2·4, 2·5, and 1·8 mg. per 100 ml. on four occasions. Harrison and Harrison (1952) have given the mean serum-citrate level in infants aged from 2 months to 2 years as 2·5 mg. per 100 ml., with a range of 2·0–3·4 mg. per 100 ml. Thus the serum-citrate level was low in the active phase and gave no indication of increased vitamin-D effect in which raised levels up to 6 mg. per 100 ml. may be obtained (Harrison 1954).

The twenty-four-hour urinary output of citrate in the active phase was 9·5 mg. and 10·6 mg. on two occasions and in the recovery phase 96 mg. The output in the active phase was low and that in the recovery phase low normal in contrast to the high urinary output of citrate in hypervitaminosis D.

Cholesterol Metabolism

Hypercholesterolæmia was a feature of cases 2, 3, 4, and 6. Cholesterol was not estimated in case 1. Lowe et al. (1954), Creery and Neill (1954), Dawson et al. (1954), and Macdonald and Stapleton (1955) have all reported hypercholesterolæmia in idiopathic hypercalcæmia. Vitamin-D intoxication in infancy has been reported with either a low or a normal plasma-cholesterol level (Jelke 1946, Fanconi and de Chastonay 1950). Coincidental plasma-cholesterol and serum-calcium levels were estimated most frequently in case 4, and there was a striking parallelism between them (fig. 4). Altogether twenty-two coincidental serum-calcium and plasma-cholesterol levels were estimated in cases 2, 3, 4, and 6. The coefficient of correlation between these was +0·58, with a standard error of 0·22. There was thus a statistically significant positive correlation between serum-calcium and plasma-cholesterol levels.

In view of this we examined the same relationship in previously published cases in which coincidentally estimated levels are available. Lowe et al. (1954) reported fifteen such pairs of levels in 7 cases, Dawson et al. (1954) five such pairs of levels in 1 patient, and Macdonald and Stapleton (1955) nine such pairs in 2 cases. By combining these twenty-nine pairs with our twenty-two pairs the scatter diagram shown in fig. 6 was obtained. The coefficient of correlation of these results is +0·72, with a standard error of 0·14, again indicating a significant positive correlation between serum-calcium and plasma-cholesterol levels.

Certain cholesterol derivatives will in the standard laboratory test for total cholesterol be estimated as the latter substance. At the same time it is recognised that some cholesterol derivatives have a vitamin-D-like effect —e.g., vitamin D_2 is derived from 7-dehydrocholesterol. Also the healthy infant synthesises cholesterol (Gamble and Blackfan 1920). In view of the hypercholesterolæmia and hypercalcæmia and the demonstrated correlation between them it seems that the disordered metabolism of calcium in idiopathic hypercalcæmia could be related to a disorder of cholesterol metabolism. It is tempting to speculate that the latter takes the form of excess production of cholesterol derivatives with a vitamin-D-like effect but with other and toxic effects also. It is recognised that sterols exist which are antirachitic (and can presumably therefore produce hypercalcæmia) but also predominantly toxic—e.g., toxisterol. The presence

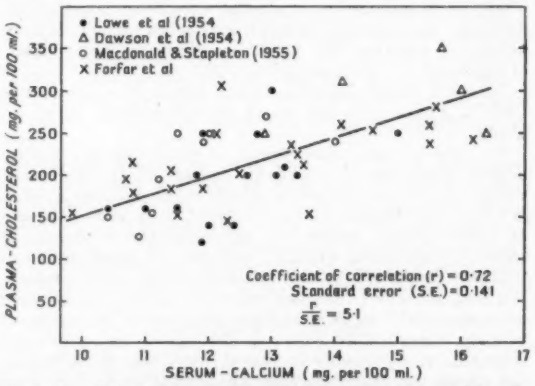
• Lowe et al (1954
△ Dawson et al (1954)
○ Macdonald & Stapleton (1955)
× Forfar et al
PLASMA - CHOLESTEROL (mg. per 100 ml.)
SERUM - CALCIUM (mg. per 100 ml.)
Coefficient of correlation (r) = 0·72
Standard error (S.E.) = 0·141
r/S.E. = 5·1

Fig. 6—Correlation between plasma-cholesterol and serum-calcium in present and in previously published cases.

of a substance of this kind would be in keeping with the symptomatology and biochemistry of idiopathic hypercalcæmia.

The free-cholesterol/cholesterol-ester ratio was estimated seven times in the acute and early recovery phases of hypercalcæmia (cases 3, 4, and 6) and found to be 0·71–2·17 (mean 1·25). This compared with 0·35–1·53 (mean 0·56) in 10 controls of the same age. The rise in the ratio was accounted for predominantly by a rise in the free cholesterol fraction.

On serum-electrophoresis (case 6) 11% of cholesterol was found to be attached to α-lipoprotein and 89% to β-lipoprotein, compared with the usual ratio of a third to α-lipoprotein and two-thirds to β-lipoprotein.

No abnormal sterols could be demonstrated by reverse phase chromatography.

Effect of Cortisone

Anderson et al. (1954) have shown that cortisone reduces the serum-calcium level in the hypercalcæmia which may accompany sarcoidosis, and have suggested that cortisone antagonises vitamin D.

Cortisone (25 mg. daily) was given to case 4 for three periods of five to seven days, and prednisolone (5 mg. daily) to case 6 for three weeks. On each occasion the serum-calcium level fell. The balances studied in case 6 showed that prednisolone reduced the retention of calcium and phosphorus (table IV). Cortisone also antagonised the effect of calciferol (table IV).

We conclude from these findings that cortisone reduced the absorption of calcium and phosphorus from the alimentary tract, and that it did so in virtue of an anti-vitamin-D-like effect.

During prednisolone therapy a serum-citrate level which had been 0·7 mg. per 100 ml. rose to 1·2 mg. per 100 ml.

Cortisone in case 4 did not produce any detectable clinical improvement. In fact on three occasions its administration was accompanied by a considerable increase in vomiting. It did not cause any consistent increase in weight and did not appear to improve appetite or to reduce lassitude. Prednisolone in case 6 appeared to produce clinical improvement. Appetite improved, vomiting diminished, and there was a steady gain in weight, which continued after prednisolone was withdrawn. Further experience will be necessary before the therapeutic rôle of these drugs can be adequately assessed.

Discussion

Fatal vitamin-D poisoning has been reported in infancy:

Malmberg's (1929) patient, who had been given up to 2 teaspoonfuls of cod-liver oil daily from the age of 3 weeks,

died at the age of 4 months with generalised œdema, rickets, and cardiac degeneration.

Putschar (1929) described an infant who had been ill from birth and died at the age of 5 months after having had a moderate excess of vitamin D for ninety days.

The dosage of vitamin D is given in only one of Thatcher's (1931, 1936) cases. About 1500 units daily was given after the first signs of disease had appeared.

At necropsy both of Thatcher's cases and Putschar's case had renal calcification in and around the tubules—a lesion now recognised to occur in idiopathic renal acidosis with nephrocalcinosis. None of these patients was subjected to biochemical studies. They appeared to have been ill before any increase of vitamin D was given, and it is difficult to accept them as proved cases of vitamin-D poisoning or of idiosyncrasy.

A more convincing case has been reported by Ross and Williams (1939) in an infant who had been premature at birth and had received vitamin D 20,000–40,000 units daily for several months. He died of pneumonia and at necropsy had widespread visceral calcification.

Non-fatal cases of vitamin-D poisoning have been reported by Ross and Williams (1939), Jelke (1946), and Fanconi and de Chastonay (1950). The dosage was 20,000–100,000 units a day for weeks or months.

Thus indisputable vitamin-D poisoning in infancy has been associated with very high intake of vitamin D, and even with dosages of this order recovery, if it occurred, took place within a month to six weeks of withdrawal of vitamin D, a considerably shorter period than is required for recovery in many cases of idiopathic hypercalcæmia.

It is clear that many of the features of idiopathic hypercalcæmia are in keeping with an excessive vitamin-D effect, but there are also features significantly out of keeping with the known effects of calciferol. These two groups are contrasted in table v. The hypothesis of

TABLE V—FEATURES OF IDIOPATHIC HYPERCALCÆMIA

Evidence of vitamin-D-like effect	Unlike calciferol effect
Symptoms	Vitamin-D intake may be low
Radiological changes in bones	Absence of significant clinical change on administration of calciferol
Increased absorption of calcium from alimentary tract	Absence of renal response to calciferol
Increased retention of calcium	Possible duration of illness after withdrawal of vitamin D
Hypercalcæmia	Increased retention of phosphorus
Hypercalcuria	Hypophosphaturia
Azotæmia	Hypocitræmia and hypocituria
Serum-alkaline-phosphatase level lowered	

hypersensitivity to vitamin D will not accommodate some of the features of hypercalcæmia, unless it is also postulated that the hypersensitivity is accompanied by a profound disturbance of response to vitamin D.

The postulation that idiopathic hypercalcæmia of infancy results from a disturbance of cholesterol metabolism with the production of a hypercalcæmic but toxic substance could explain most of the features. The low intake of vitamin D and prolonged course in certain cases would be understandable. The administration of vitamin D might add insult to injury already present but would be unlikely to produce any severe hypersensitivity reaction. The lowering of the serum-calcium level by a low-calcium diet or by cortisone would, in so far as hypercalcæmia is itself harmful, be beneficial. It would not necessarily obviate other toxic effects. As a corollary we observed some dissociation between the serum-calcium level and the patient's clinical state: symptoms were not worst when the serum-calcium level was highest; nor were they least when the serum-calcium level was lowest. If case 5 is accepted as one of idiopathic hypercalcæmia sine hypercalcæmia, his illness cannot have been related only to his serum-calcium level; but the conception of a substance predominantly toxic and only moderately hypercalcæmic would explain such a case. It would need to be accepted that the mode of action of such a substance differs a little from that of vitamin D—e.g., in certain aspects of phosphorus and citrate metabolism.

The arithmetical product of the serum-calcium and plasma-cholesterol levels may have some diagnostic significance. In ten estimations on infants aged 6–15 months who were convalescent from, or in the active stage of, other diseases the range of this product was 1007–2726 (mean 1717). In case 5 (serum-calcium 11·2 mg. per 100 ml.) this product was 2946. When he had recovered, the product had returned to within normal limits (1940). So, too, on recovery did the products in cases 2, 3, and 4 become normal (1786, 2047, and 2333 respectively). The term idiopathic hypercholesterocalcæmia would perhaps more accurately describe this disease and would embrace those cases which appear to be of the same disease but by definition are excluded by the term idiopathic hypercalcæmia.

There are certain analogous features between idiopathic infantile hypercalcæmia and the hypercalcæmia which may accompany interstitial plasma-cell pneumonia, and Hallman et al. (1954) suggest that there may be some relationship between the two. None of our patients exhibited the clinical features of interstitial plasma-cell pneumonia, but 3 of them had had fairly prolonged preceding respiratory infections, which in 1 case lasted three months. The clinical course and usually self-limiting nature of idiopathic hypercalcæmia of infancy would be in keeping with an infective ætiology.

Summary

5 cases of idiopathic hypercalcæmia are described, together with a possible 6th.

In 3 cases the intake of vitamin D was somewhat below that normally accepted in this country, and in only 1 was it above 2000 units a day.

Balance studies showed that there was increased retention of calcium and phosphorus.

Calciferol produced no significant clinical change and did not increase the retention of calcium more than might be expected in a healthy infant.

Moderate hypercalcuria was present, but calciferol did not further increase the urinary output of calcium.

The urinary excretion of phosphorus was low.

The plasma-cholesterol level was usually raised in the active phase of hypercalcæmia. This was due to a rise in the free cholesterol fraction. There was a significant positive correlation between the plasma-cholesterol level and the serum-calcium level.

The serum-citrate level and the urinary output of citrate were those of hypovitaminosis D rather than of hypervitaminosis D.

These results are interpreted as showing that, although there is evidence of a vitamin-D-like effect in idiopathic hypercalcæmia, neither excessive ingestion of vitamin D nor specific hypersensitivity to vitamin D explains all the features.

We suggest that in idiopathic hypercalcæmia a disturbance of cholesterol metabolism produces a cholesterol derivative with hypercalcæmic and toxic effects.

The possibility that this disturbance of cholesterol metabolism is due to infection is considered.

A low-calcium diet induced a negative calcium balance and a lowered serum-calcium level without producing any consistent clinical improvement.

Prednisolone reduced the absorption of calcium and phosphorus from the alimentary tract.

Cortisone lowered the serum-calcium level and antagonised the effect of ingested calciferol.

We wish to thank Prof. R. W. B. Ellis for his support.

References overleaf

THYROIDECTOMY AND THE RECURRENT LARYNGEAL NERVES

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"DAMAGE to one recurrent nerve produces a permanent huskiness of the voice." These words from a well-known textbook on surgical anatomy represent a widely held opinion on the results of damage to the recurrent laryngeal nerves during thyroidectomy.

It has always been our practice for an ear, nose, and throat surgeon to examine both preoperatively and postoperatively the larynx of patients undergoing thyroidectomy and, where there is evidence of damage to a nerve, to follow these patients and to assess the degree of disability. In doing this, it has become clear that the problem could not be stated so simply as in the quotation given above, nor is the picture so gloomy. We therefore decided to investigate the frequency of damage, any predisposing factors that increase the risk of damage, and the subsequent condition of such patients.

We examined the records of 300 patients operated on between January, 1949, and December, 1954, for non-malignant conditions of the thyroid gland. All the cases showing nerve damage were followed up for at least a year; the last case in the series occurred in October, 1954.

Operative Technique

The technique of thyroidectomy has remained unchanged for years, being based on that of Joll (1932).

The gland is exposed by a collar incision with separation of the infrahyoid muscles in the midline. These muscles are rarely divided, and in no case in this series was it considered necessary to do so. In no case was the sternum split to deliver an intrathoracic goitre. The inferior thyroid artery is ligated in continuity in the areolar tissue lateral to the capsule of the gland and as close to the carotid sheath as possible; but in a few cases it was not found in this position, and a prolonged search was not pursued. The recurrent nerves are not looked for and identified, reliance being placed on leaving a slice of the posteromedial surface of either lobe to protect the nerve. To trace the course of the nerves in the neck is only possible after dislocation of the lateral lobes, especially when they are enlarged, and there is little doubt that many injuries to the nerves occur during the dislocation. The cut surface of the gland is stitched to the fascia covering the trachea to control bleeding, and only the superficial layer of the wound is drained. We always aim at accurate hæmostasis in the area deep to the "strap" muscles, however tedious and time-consuming it may be. The extent of the resection, of course, varies with the condition of the gland, but when the gland is toxic about seven-eighths of each lobe is removed.

The larynx is examined four days before operation and five days after operation; and, if there is any doubt about whether the nerve is injured or not, the larynx is examined again a month later.

Frequency of Damage

In 40 cases there was evidence of damage to one or both of the recurrent laryngeal nerves—a frequency of 13·3%. In 22 cases the right nerve was damaged, in 17 cases the left nerve, and in 1 case both nerves were damaged. Of these patients 18 recovered completely and 22 did not. The bilateral case did not recover. In 1 case one nerve had been permanently damaged at a previous operation and the other nerve was damaged in this series. There was again no recovery, and a bilateral paralysis resulted.

Recovery of Full Movement of Cord

Of the 18 cases (6%) in which full movement of the cord was recovered, 6 had initially a partial lesion of the cord, manifesting itself as sluggishness of the cord and weakness in adduction of the cord, and all these cases recovered rapidly and completely, 5 before leaving hospital and the other 1 within a month. Only 2 of these patients noticed any change in their voices.

In 11 cases there was initially complete paralysis of a cord in the paramedian position midway between adduction and abduction, and in 1 case the paralysis was partial within six days of operation and complete a month later. All these patients recovered full movements within a year. The most rapid recovery was in two months, and the slowest in almost a year. With recovery in movements went recovery of a full range of voice except in 4 cases: 1 patient was still slightly husky, and the other 3 stated that under an emotional strain (usually anger) their voices tended to "fade away," which seemed to indicate early fatigue in the affected muscles.

In 4 of these cases difficulties were met with at operation and noted, but in the other 14 cases the operation was uneventful. The difficulties were as follows:

(1) A large gland displacing the trachea to the left and retrosternal on the right side—the right nerve was damaged.

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(2) Postoperative bleeding necessitating reopening of the wound, evacuation of clot, and suture of a bleeding point on the right side—the right nerve was damaged.

(3) A large retrosternal gland on the left side, but the right nerve was damaged.

(4) A second operation with a retrosternal prolongation on the right side, and the right nerve was injured.

No Recovery of Movement of Cord

Of the 22 cases (7·3%), including 2 bilateral cases, in which no movement of the cord was recovered, 14 showed excellent compensation by the opposite cord. This occurred soon after operation, and compensation was complete in 10 cases. So good was the compensation in these 10 cases that, when they were examined recently for this review, it was not suspected until the larynx was examined that the cord had not recovered. These patients could sing and shout and described their voices as perfect. 4 of them had not noticed any abnormality in their voices even shortly after operation. The other 4 had compensated fairly well but still had some huskiness or found that their voices were easily fatigued, being normal for only the first few minutes of speech. Nevertheless all had shown considerable improvement and did not consider that they were handicapped by this weakness.

This left 8 cases (2·7%) with no improvement and included the 2 cases with bilateral paralysis where compensation was obviously impossible. All these patients had voices which were husky and easily tired, and in the bilateral cases the voices had a "brassy quality" with some inspiratory stridor.

In 15 of these cases difficulties were noted during the operation, whereas in the other cases the operation appears to have been uneventful. The difficulties were as follows:

(1) A second operation for removal of a diseased right lobe with a retrosternal prolongation. The inferior thyroid artery could not be seen on the right side and was not tied. There was considerable bleeding during the operation, and two days later the wound was reopened for evacuation of clot and control of bleeding. The right nerve was damaged.

(2) A large retrosternal prolongation on the left side. The left nerve was damaged.

(3) A very vascular gland which bled postoperatively and necessitated reopening of the wound on two occasions for evacuation of clot and control of bleeding.

(4) A second operation with a difficult dissection, and the nerve was seen to be divided at operation.

(5) A large friable gland with a retrosternal prolongation on the left. The left nerve was damaged.

(6) A large gland with retrosternal prolongations on both sides, and the left inferior thyroid artery was not tied. The left nerve was damaged.

(7) A large retrosternal prolongation on the right side. The right nerve was damaged.

(8) A second operation with a retrosternal prolongation on the left side. The left nerve was damaged.

(9) A retrosternal prolongation on the right side. The right nerve was damaged.

(10) A second operation with a difficult dissection on the right side. The right nerve was damaged.

(11) A second operation, and the left inferior thyroid artery was not tied. There was considerable bleeding, and the left nerve was damaged.

(12) A retrosternal prolongation on the right side, and the inferior thyroid artery on the right side was not tied. The right nerve was damaged.

(13) A very large nodular right lobe. The right nerve was damaged.

(14) A very large hæmorrhagic gland. Both nerves were damaged.

(15) A second operation with a retro-œsophageal prolongation on the left side. The left nerve was damaged, and the right nerve had been damaged at the first operation in 1925.

There was no record in any case of any abnormality in the anatomy of the neck except in so far as it was produced by the diseased gland.

The following is a summary of the difficulties met with in 19 cases:

11 cases with retrosternal prolongation of a lateral lobe.
7 cases where a second operation was being done.
5 cases in which hæmorrhage was severe, and in 3 cases the wound had to be reopened.
1 case where there was a retro-œsophageal extension of a lateral lobe.

There were 21 cases in which no difficulty was noted at operation. In these cases the proportion of right nerves injured to left nerves injured is 2 : 1 (14 : 7 cases). This is higher than the proportion for the whole series (23 : 18) and seems to be significant.

Discussion

The first important fact emerging from this review is the frequency of 13·3%, which was far higher than expected. This shows a close correlation with Wade's (1955) conclusion that 15% of recurrent nerves are in absolute or partial danger during thyroidectomy. This fact is revealed because each case was examined irrespective of whether the patient complained of a voice change or not. If we had examined only those who complained of voice changes at a follow-up attendance, the frequency would have been 4–5%.

It was to be expected that a damaged recurrent nerve could recover. It is presumed that, in cases showing early recovery, the nerve lesion was due to stretching, causing neurapraxia, whereas in the few cases that took over six months to recover the axons had been damaged (axonotmesis) without disruption of the sheaths, possibly by being crushed in a hæmostat. This is suggested by the 4 cases that showed full movements of the cords but still had some slight impairment of voice function. In the 1 case where the nerve lesion initially appeared to be partial and later was certainly complete we suggest that fibrosis following hæmorrhage round the nerve had produced this effect; but it is only an isolated case, and perhaps the occasional difficulty in examining the larynx soon after operation may, in this case, have led us to classify as partial a lesion which was, in fact, complete.

Although it is well known that where the nerve does not recover, compensation can be good, we were surprised to find it so good in so many cases. In the 10 cases that showed complete functional recovery great care was taken to ascertain that this was really so. Only 6 unilateral cases (2%) showed no significant recovery.

As regards the causes of damage to the nerves, in 19 cases where difficulties were noted by far the most common difficulty was that presented by a large retrosternal prolongation of the gland (11 cases). This suggests that the nerves are more vulnerable the lower the dissection proceeds. At this level a greater proportion of nerves are in an exposed position lateral to the tracheo-œsophageal groove, and when the lobe is delivered the nerve is drawn forwards with it. Certainly it seems that special care is required in delivery of a retrosternal prolongation of the gland; though a blind dissection may be necessary, it cannot be assumed that the nerve is out of danger.

Many workers have drawn attention to the vulnerability of the nerves when they lie in a variable relationship to the inferior thyroid artery, but the nerves are also in danger at a lower level. When a retrosternal prolongation or a lower-lobe adenoma is dislocated upwards and forwards, the nerve is also drawn forwards. Though it is debatable whether the nerve should be dissected through-

out its course in the neck, it is certain that care should be taken that only the inferior thyroid veins are divided at the lower pole, and the web of tissue should be carefully teased out and scrutinised before hæmostats are applied or ligatures tied. Dislocating a diseased lobe may cause an injury from which the nerve will recover, but it can easily be converted into a permanent injury.

In 7 cases the gland was being explored for a second time, and it is obvious that there is then greater difficulty in exposing the gland and avoiding damage to the nerve. It may be suggested that in these cases it would be wise to expose the nerves if possible, but we feel that the dissection necessary for exposure would itself cause damage. In 3 cases severe postoperative bleeding necessitated reopening of the wound to control bleeding, and it is obvious that great care should be taken to avoid the nerve; but bleeding from an area near the nerve must be controlled, and the risk of nerve damage accepted.

In 21 cases (7%) no operative difficulty was noted and yet one of the nerves was damaged. In 14 of these cases the nerve recovered; presumably the nerve was either stretched or caught in a hæmostat in these cases. It has already been pointed out that the right nerve was damaged twice as often as the left in these cases. Bowden (1955) has recently concluded that, from anatomical considerations alone, there is an inherent risk of damage to the nerves during thyroidectomy. She points out that the nerve takes an irregular course on the right side more commonly than on the left. She also found that, at the level of the gland, only 73 of 134 nerves on the right, and 85 of 133 nerves on the left, were lying in the tracheo-œsophageal sulcus; the rest were in an exposed position. Again the right nerve seems to be slightly more vulnerable.

Conclusions

We agree with Bowden (1955) that there is an inherent risk of damage to the recurrent laryngeal nerves during thyroidectomy, and we add that the risk is greatly increased in the presence of certain pathological conditions of the gland, of which the most important is the retrosternal prolongation of the lateral lobes.

We emphasise the danger to the nerves at quite a low level in the neck in the presence of lower-lobe adenomata and retrosternal prolongations, in addition to their vulnerability where they are crossed by, or mingle with, the branches of the inferior thyroid artery. It is in these cases that permanent damage to the nerves can be avoided.

The prognosis of the damaged nerve is good. Many recover. In those that do not recover, compensation by the other cord is usually good and functional recovery rapid and often complete.

Summary

In a series of 300 consecutive thyroidectomies 39 patients sustained damage to one recurrent laryngeal nerve and in 1 case both nerves were damaged.

In 18 cases the damaged nerve recovered completely, while in 22 cases recovery did not occur. The causes of damage to these nerves is discussed and their recovery of function assessed.

An accurate estimate of the frequency or extent of damage to the recurrent laryngeal nerves can only be obtained if the vocal cords are examined both preoperatively and postoperatively, preferably by an ear, nose, and throat surgeon.

Our thanks are due to Mr. Robert Strang for permission to include his cases in this review.

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AN INTRAVENOUS STEROID ANÆSTHETIC

EXPERIENCES WITH VIADRIL

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THE word "steroid" is a "generic name for a group of compounds comprising the sterols, bile acids, heart poisons, saponins and sex hormones" (Grant 1949). Fifteen years ago Selye began an investigation into the anæsthetic properties of a large number of steroids (Selye 1941a and b, 1942a and b, 1943), all of which, except pregnanedione, exhibited hormonal activity. Recently these results were reviewed by Laubach et al. (1955), and the results of pharmacological experiments suggested that a derivative of pregnanedione (21 hydroxy-pregnane-3, 20 dione, sodium hemisuccinate) ("Viadril") might be suitable for human anæsthesia. The drug was sufficiently soluble in water to be given intravenously; it had a far higher therapeutic index than thiopentone; it was not carcinogenic; and it showed no signs of hormonal activity, such as salt retention. This drug was released for simultaneous clinical trials in the U.S.A. (Gordon et al. 1955, Murphy et al. 1955, Howland et al. 1956), Italy (Dauri 1955, Taddei 1955), Sweden (Vinnars 1956), and in this country, where we have used it. An identical compound has been studied in Scotland by Taylor and Shearer (1956). The structure of viadril and some other steroids is shown in fig. 1.

Our First 100 Cases

The 100 operations performed with viadril as the basic anæsthetic were:

Laryngopharyngectomy (first stage)	2	Appendicectomy	3
Laryngopharyngectomy (second stage)	2	Prostatectomy	1
Partial gastrectomy	6	Partial nephrectomy	1
Partial thyroidectomy	6	Cholecystectomy	1
Œsophagectomy	2	Vulvectomy and bilateral inguinal adenectomy	1
Excision of rectum	3	Disarticulation of the hip	1
Excision of colon	3	Hypophysectomy	1
Hysterectomy	4	Subdiaphragmatic abscess	1
Colporrhaphy	5	Appendicular abscess	1
Radical mastectomy	4	Herniorrhaphy	2
Cystectomy of breast	2	Mastoidectomy	1
Bilateral adrenalectomy	2	Fissure-in-ano	1
Unilateral adrenalectomy	1	Sigmoidectomy	1
Oöphorectomy and adrenalectomy	3	Diagnostic laryngoscopy	1
		Major dental operations	38

The accompanying table illustrates our use of viadril in a few of these 100 cases. The first two operations in the table illustrate how the technique has been modified in the light of experience so that less viadril is now given and most of it is administered before and during the first few minutes of the operation.

Method of Administration

Viadril was originally injected as a 2·5% solution into a fast-running intravenous drip (Murphy 1955), but painful venous thrombosis followed in most cases. Murphy et al. (1955) reported only a 3% incidence of venous thrombosis, but we did not realise that their "fast-running" drip was one which was pouring through the drip-chamber like a running tap. By trial and error, it was found that solutions weaker than 0·5% in physiological saline produced no vein troubles. A suitable solution can most readily be prepared by dissolving five 500-mg. vials of viadril in the usual 540-ml. bottle of intravenous saline; however rapidly it is run in, this solution is trouble-free, and causes no sclerosis of veins.

With a drip-rate of 150 per min. the average patient becomes drowsy within 5 to 7 min. and falls asleep in 10 min., although he can be roused by questioning or

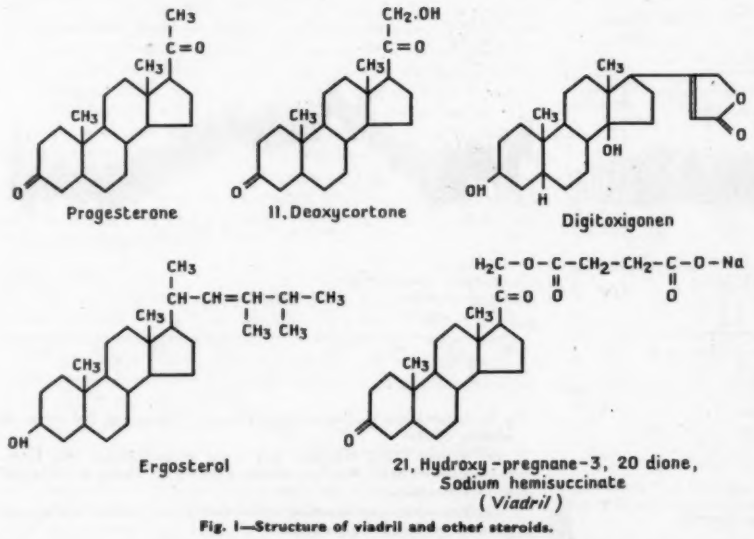


Fig. 1—Structure of viadril and other steroids.

touching the arm. After 15 min. he seems deeply asleep and cannot be roused by shouting or shaking, although he reacts to painful stimuli, in which respect viadril resembles intravenous bromethol ('Avertin'). At this stage a carefully inserted pharyngeal airway does not evoke the pharyngeal reflexes or cause laryngospasm. This is in striking contrast to thiobarbiturate anæsthesia, but resembles the chlorpromazine-promethazine-pethidine sequence ("lytic cocktail"). Laryngoscopy can also be performed, although there is slight resistance from the masseter muscles, and there may be slight but semi-purposeful limb movements. On the other hand, the vocal cords can be viewed with ease; they are wide apart and, when stimulated by touch, close and open again. This also is very different from barbiturate or thiobarbiturate anæsthesia when similar stimulation would not only send the vocal cords into spasm but produce a sphincteric closure of the proximal aperture of the glottis itself. Endotracheal intubation was sometimes possible under viadril anæsthesia alone, after which nitrous oxide and oxygen (5/2 mixture) was adequate to maintain anæsthesia for relatively simple procedures such as major dental surgery. More often, however, analgesics such as pethidine were added, and muscle relaxants as well, particularly for thoracic or abdominal surgery.

Hastening Induction

The usual induction period of 20–25 min. can be halved in the following way. Directly the patient falls asleep a mask can be held within an inch or so of the face and pure nitrous oxide administered. The mask is gradually lowered until it touches the face, when 20% oxygen is added to the mixture. After another 2 min., 30–50 mg. of pethidine is injected intravenously,* followed by a suitable dose of a muscle relaxant; in each case the doses are regulated according to circumstances in the usual way. After another minute the mask can be removed, laryngoscopy performed, and an endotracheal tube passed; nitrous oxide and oxygen are then given to maintain anæsthesia.

Electro-encephalographic Changes

Steroid, barbiturate, and thiobarbiturate narcosis are indistinguishable so far as the electro-encephalograph (E.E.G.) is concerned. In each case, four arbitrary levels of anæsthesia can be distinguished by the E.E.G. (Bellville et al. 1956, Howland et al. 1956). After a few minutes of intravenous viadril the E.E.G. changes, and when the deepest level (level 4) is reached—i.e., when cortical activity has been fully suppressed—patients still move slightly when towel clips are applied. It is obvious, therefore, that cortical activity is suppressed before full surgical anæsthesia is is attained; and the E.E.G. seems to be useless for assessing the varying depths of surgical anæsthesia itself.

Respiration

Doses of viadril up to 2 g. do not appear greatly to affect either the depth or rate of respiration however rapidly they are given (fig. 2), although Howland et al. (1956) had occasional patients in whom tidal-volume was considerably diminished, and there was one who

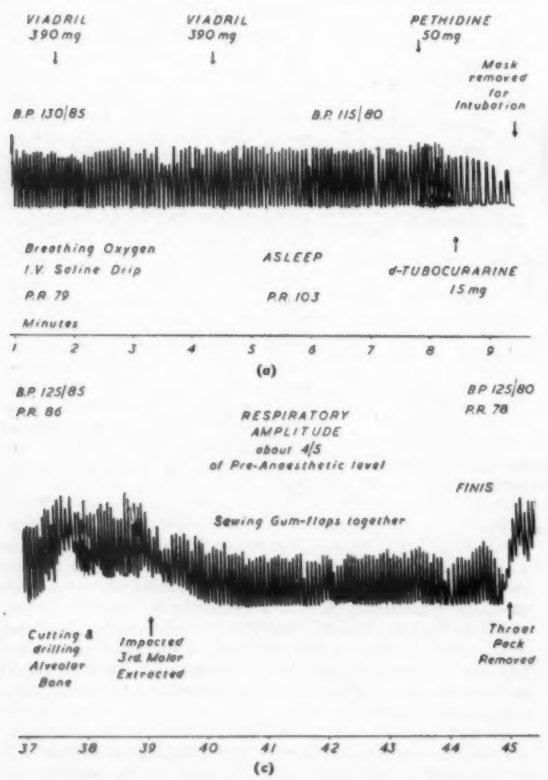
* Pethidine, *d*-tubocurarine chloride, and suxamethonium should not be injected into the viadril drip, since the first causes milkiness and the other two produce a flocculant precipitate when added to 0·5% viadril solution. Thiopentone, thialbutone, gallamine, atropine, neostigmine, nikethamide, nalorphine, and methylamphetamine are compatible with viadril.

EXAMPLES OF OPERATIONS PERFORMED WITH VIADRIL AS BASIC ANÆSTHETIC

Operation	Time *		Viadril (0·5%)			Adjuvants			Patient		
			Dose (mg.)	Time of infusion		Pethidine (mg.)	Muscle relaxant (mg.)	Tr : N_2O : O_2	Sex	Age	Condition
	hr.	min.		hr.	min.						
Laryngopharyngectomy	4	23	1560	4	29	50	Nil	N_2O : O_2 : Tr	F	59	Fairly fit
Laryngopharyngectomy	5	5	1130	..	37	60	S.M. 50	N_2O : O_2 : Tr	F	50	Fit
Œsophagectomy	2	46	1170	..	30	50	T.C.C. 20	N_2O : O_2	F	60	Fairly fit
Œsophagectomy	3	21	1255	..	31	70	T.C.C. 15	N_2O : O_2	F	72	Frail
Partial gastrectomy	1	27	1100	..	15	80	T.C.C. 33	N_2O : O_2	M	49	Fit
Partial gastrectomy	1	39	975	..	40	90	T.C.C. 35	N_2O : O_2	M	48	Fit
Perineal resection of rectum ..	1	9	1150	1	5	30	T.C.C. 10	N_2O : O_2	M	79	Frail
Anterior resection—anastomosis of rectum	1	50	1250	..	25	70	T.C.C. 33	N_2O : O_2	F	65	Fairly fit
Disarticulation of hip	2	28	1170	..	32	100	G. 120	N_2O : O_2	F	50	Fit
Partial thyroidectomy	1	23	1000	..	22	30	T.C.C. 10	N_2O : O_2	F	63	Thyrotoxic, otherwise fit
Partial thyroidectomy	1	4	960	..	49	60	T.C.C. 15	N_2O : O_2	F	47	Thyrotoxic and frail
Total colectomy	2	27	1470	..	32	90	T.C.C. 20	N_2O : O_2	F	49	Ulcerative colitis, otherwise fit
Bilateral adrenalectomy	1	6	1170	..	32	70	T.C.C. 15	N_2O : O_2	F	59	Diabetic, otherwise fit

* Including induction of anæsthesia.

T.C.C. = *d*-tubocurarine chloride, G = gallamine ('Flaxedil'), S.M. = suxamethonium ('Scoline,' 'Brevedil'), Tr = trichlorethylene in minimal concentration to settle coughing if head was moved or after tracheostomy and passing of sterile endotracheal tube.



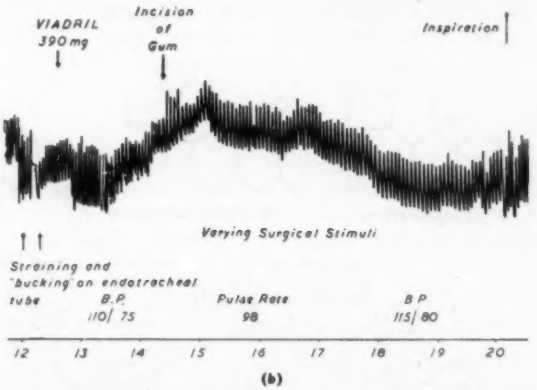


Fig. 2—Respiratory tracing during removal of impacted 3rd molar in woman of 29.

(a) Viadril (2·5% solution) and other drugs injected into intravenous saline drip. On each occasion 390 mg. of viadril was injected in two minutes.

(b) Transnasal endotracheal intubation 3 min. before this part of tracing. N_2O and O_2 via tube.

(c) Endotracheal N_2O and O_2 continuing (CO_2 absorption).

required artificial respiration for 30 min. It may be significant that these patients were all "general surgical" patients admitted to a hospital for neoplastic diseases," and many were, presumably, toxic and elderly subjects. When controlled respiration is attempted, we agree with Murphy et al. (1955) that respiration is more easily "taken over" than it is with thiobarbiturate anæsthesia. For instance, during an abdominothoracic œsophagectomy, using 1225 mg. of viadril and lasting 3 hours 21 min., controlled respiration was easily maintained under nitrous oxide and oxygen, with the addition of 50 mg. of intravenous pethidine and a dose of *d*-tubocurarine chloride as small as 15 mg. (the entire dose of tubocurarine was given before endotracheal intubation).

Reflexes

As we mentioned, the pharyngeal reflex is soon suppressed—i.e., when 500–600 mg. of viadril have been given. At this stage, also, there is no laryngospasm when the vocal cords are stimulated, although their momentary closure suggests that they have preserved their sensitivity. After intubation, the endotracheal tube is more easily tolerated than it is under thiobarbiturate anæsthesia. Even when anæsthesia is extremely light, movement of the tube rarely produces more than a few seconds breath-holding: there is a remarkable absence of the "bucking" so common under all other forms of anæsthesia. Again, bronchospasm is rare. Controlled respiration is easy, perhaps because of facilitation of the mechanism whereby the respiratory centre is depressed by continued rhythmic inflation of the lungs. When surgical anæsthesia is attained, the pupils are small and no longer react to light.

Circulation

We agree with Taylor and Shearer (1956) that the pulse-rate is very much higher than is usual under other forms of intravenous anæsthesia, although we cannot entirely agree that this is due to the fact that viadril is more of a hypnotic than an anæsthetic. Were this view entirely correct, one would expect the pulse-rate to be rapid only during surgical stimulation whereas rates of 85–105 per min. have been noted during induction, even when the infusion rate was slow. On the other hand, intravenous pethidine, a known analgesic, has significantly reduced the pulse-rate during the actual operation. Another unusual feature, which makes it hard to be dogmatic about the absence of analgesic properties, is the fact that painful stimuli, which would appreciably increase the rate and amplitude of respiration during thiobarbiturate anæsthesia, have little or no effect during steroid anæsthesia, despite a relatively high pulse-rate. Moreover, even during exceedingly painful procedures, the respiratory-rate has remained steady at rates of from 14 to 26 per min.

Sharp falls of blood-pressure have occasionally been noted but we did not find that they were confined to elderly subjects (Taylor and Shearer 1956). In our experience the blood-pressure also falls in young people, though less often than in the old (fig. 3). Such falls are much less likely if the drug is administered slowly—i.e., 60–100 drops per min.—but unfortunately this slows an already tardy induction.

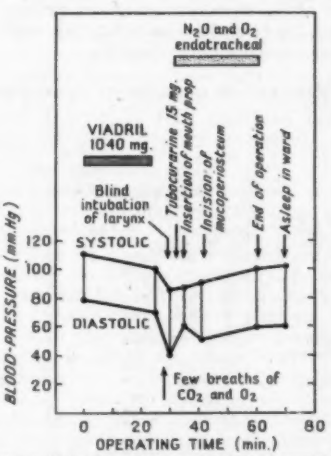


Fig. 3—Fall of blood-pressure during extraction of impacted upper and lower 3rd molars in woman of 30. Spontaneous recovery.

Muscles

Owing no doubt to the fact that we supplemented viadril directly the patient fell asleep, we have not seen

twitching or rigidity of the limbs during induction (Taylor and Shearer 1956). Often, however, there was a clonic convulsive rigidity—sometimes accompanied by generalised trembling—at the end of the operation, after stopping nitrous oxide and oxygen. This usually resolved spontaneously within 1–2 min. The muscles of the limbs, neck, and trunk were involved, and the respiratory movements were not being greatly impeded.

Although controlled respiration can be instituted after small doses of muscle relaxants, the conventional doses are necessary if full muscular relaxation is required for abdominal surgery.

After-effects

We have been greatly impressed by the absence of after-effects. Only 1 of our patients has vomited during the recovery period and no others have had any nausea. The recovery times after viadril seem to be slightly shorter than we would have expected had thiopentone been the main anæsthetic.

Postoperative fatigue is greatly reduced, even compared with other forms of intravenous anæsthesia. So interesting were these findings that a comparison was made between two series of major dental operations (60 cases in all): half had thiopentone as the basic anæsthetic and the other half viadril. Those who had thiopentone all felt slightly lethargic the next day, they lacked appetite, and a few felt slightly sick. Those who had viadril were all alert, and anxious to get home, and they ate as ravenously as their dental disabilities allowed.

One young woman had two similar and symmetrical operations within a fortnight, one with thiopentone and the other with viadril. In each case pethidine was avoided during anæsthesia and the doses of suxamethonium before intubation were identical. The length of the operations was much the same (just over an hour) and a nitrous-oxide/oxygen mixture (5/2) was used for maintenance. Quite spontaneously, this patient said she felt "very much better" after viadril than she did after thiopentone.

Even more remarkable was the lack of postoperative fatigue and the sense of well-being of patients undergoing major surgery.

22 hours after an abdomino-perineal resection of his rectum a patient carried on an interesting conversation and said that he felt better after viadril than after three other operations (appendicectomy, herniorrhaphy, and sigmoidoscopy), all under thiopentone, *d*-tubocurarine, and/or pethidine. 26 hours after an œsophagectomy a middle-aged woman was knitting an intricately designed bed-jacket! Both these patients seemed to have the same attitude towards their pain as if they had just had chlorpromazine.

Discussion

It is interesting to compare viadril with thiopentone. By and large, viadril seems capable of replacing thiopentone (or similar thiobarbiturates) in any anæsthetic sequence. It suffers, however, from the fact that it has to be given in a very dilute solution to avoid venous sclerosis, and it is, therefore, unlikely to replace thiopentone for short operations when the induction period might greatly exceed the operating-time and appreciably prolong the operating session. Owing to the rapid suppression of the pharyngeal and laryngeal reflexes, this disability can be overlooked if smooth anæsthesia is desired for laryngoscopy, or for the opening of a submandibular cellulitis. We have been particularly impressed with viadril for thyroid surgery. Not only is there less likelihood of "bucking" on the endotracheal tube as the larynx is unavoidably moved during the operation, but the docility of the throat reflexes means that direct laryngoscopy can be performed with the greatest ease at the end of the operation for evidence (or otherwise) of recurrent laryngeal palsy. In major surgery, where intravenous infusions are almost inevitable, viadril probably comes into its own; particularly since it secures so smooth and pleasant a recovery.

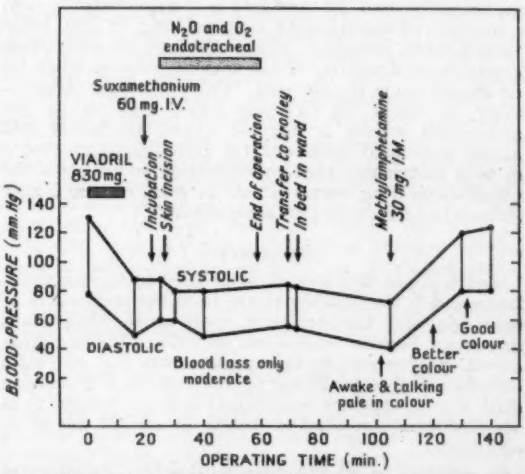


Fig. 4—Effect of intramuscular methylamphetamine on postoperative fall of blood-pressure after excision of cyst of breast in a woman of 46.

The occasional falls in blood-pressure are not so alarming as they sound. In every case the patient's appearance and pulse-volume was so good that the actual blood-pressure level surprised those recording it. Unlike "hypotensive anæsthesia" (with pentamethonium or hexamethonium or 'Arfonad'), there seemed to be no venous engorgement of the limbs, and postural ischæmia was difficult to obtain. Methylamphetamine or similar drugs, given intravenously or intramuscularly, never failed to rectify any fall in blood-pressure (fig. 4).

As for the lack or diminution of postoperative fatigue, viadril resembles the chlorpromazine-promethazine-pethidine sequence ("lytic cocktail"). Viadril, however, has the advantage that after they return to the ward patients rarely have any fall of blood-pressure and, if they do, it can readily be restored by intramuscular methylamphetamine.

Why patients feel so fit after viadril is unknown. It may well be that the drug inhibits the excretion of adrenocorticotrophic steroids during the actual operation, and that they are thus preserved to cope with the stress of the recovery period. Alternatively, this sense of well-being may be similar to that of cortisone or corticotrophin (A.C.T.H.) therapy—the cause of which is also unknown. In this respect it is interesting to note that Hoeffer and Glaser (1950) demonstrated E.E.G. changes suggestive of cortical suppression in patients who had had corticotrophin for three to five days. We intend to take E.E.G.s during their recovery from viadril to ascertain whether they demonstrate similar findings.

Not the least interesting facet of steroid anæsthesia is the light it may throw on the rhythmic causation of sleep. It is now generally agreed that the normal state of the cerebral cortex is one of inactivity or sleep and that wakefulness is maintained only by a continual bombardment of impulses from the reticulo-activating centre of grey matter situated in the brainstem. In turn this centre is activated by centripetal impulses from the entire sensory system. Barbiturate, thiobarbiturate, and steroid anæsthesia may be regarded as depressing this reticulo-activating centre so that it no longer stimulates the cortex into wakefulness and unconsciousness supervenes. This hypothesis does not, however, explain the rhythm of sleep or the increased and overwhelming desire for sleep after long periods of wakefulness. 19th-century

physiologists used to postulate a "hypnotoxin"—i.e., a noxious chemical agent accumulating in the brain "which when present in sufficiently high concentrations arrests cerebral activity which does not recover again till the alleged toxin is destroyed" (Wright 1952). Alternatively, it might be (Kalmus 1956) that an as yet unidentified steroid is secreted during the stress and fatigue associated with wakeful activity, which builds up to a sufficiently high concentration to suppress the reticulo-activating centre which, in turn, can no longer activate the cortex, so that sleep ensues ?

Summary

Viadril is the first steroid to be used in human anæsthesia and is the first departure from the derivatives of barbituric and thiobarbituric acids since intravenous anæsthesia became established in 1932. Judging from animal experiments, its therapeutic index (i.e., the ratio between the dose producing apnœa and the dose causing death during artificial respiration) is much greater than any barbiturate or thiobarbiturate in clinical use as an anæsthetic.

In contrast to all the ultra-short-acting barbiturates and thiobarbiturates, viadril rapidly suppresses the pharyngeal and laryngeal reflexes; even under the lightest narcosis it is difficult to provoke vomiting or laryngospasm.

Falls of blood-pressure and a rise in pulse-rate are more frequent with viadril than with thiobarbiturate anæsthesia. With viadril, however, the lowering of blood-pressure often rectifies itself and, if it does not, it can readily be remedied by intramuscular or intravenous methylamphetamine or similar drugs.

Vomiting is rare after viadril anæsthesia; post-operative fatigue is slight or absent and patients experience a sense of well-being during their recovery from operation similar to that produced by cortisone.

In concentrations greater than 0·5%, viadril solutions unfortunately give rise to painful venous thrombosis; it must therefore be given as an intravenous drip and, consequently, the induction period is long. This will probably limit the drug's use in the shorter operations. For long operations, where an intravenous drip is almost inevitable, viadril causes less inconvenience from the point of view of time and may well prove the anæsthetic of choice.

Whether used alone or in place of thiopentone in the usual hypnotic-analgesic-muscle relaxant sequence, viadril not only offers ideal operating conditions but ensures a more comfortable recovery period than any other anæsthetic or anæsthetic combination in common use.

'Viadril' was kindly supplied by Pfizer Ltd.

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LIVER PREGNANCY

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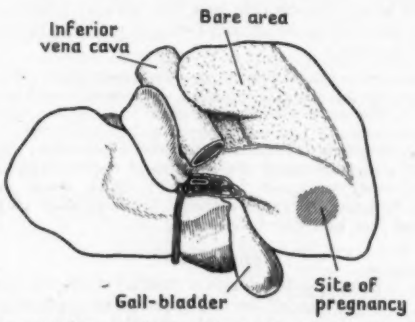
IN most extra-uterine pregnancies the abnormal placental site is in the pelvis. Cornell and Lash (1933) found records of 236 pregnancies involving placental attachment to 641 sites, the great majority being in the pelvis. In 8 cases one site of attachment was the liver, but note was not made whether this was ever the sole area. Echols (1934) and Barrett (1952) mentioned patients in whom the placental site involved several organs, one of which was the liver. Billington and Goodchild (1948), Serebriakova and Kanshin (1952), and Van de Loo (1953) described placental sites solely in the liver. The following is another example of this rare condition.

Case-report

A woman, aged 39, was admitted to the Royal Portsmouth Hospital at 6 A.M. on May 19, 1955. At 10 P.M. on the previous evening very severe pain began suddenly in the right hypochondrium. The pain became generalised in the abdomen and was referred to the left shoulder and the back. The patient was nauseated but did not vomit and passed no urine, fæces, or flatus. Before this illness her health had been good except for a miscarriage in 1945. She had three children aged 9, 3, and 2 years. She said that her appetite had been abnormally good in the previous two weeks but that she had some epigastric discomfort immediately after food. Micturition and bowel habit had been normal, and she had no abnormal respiratory or cardiovascular symptoms. Menstruation had been regular, lasting 4 or 5 days in each cycle of 27 or 28 days. The loss had tended to increase in recent years, and there was a slight offensive intermenstrual vaginal discharge. The last period of menstruation was from April 25 to April 29, 1955.

On admission the patient was shocked and in pain. Her tongue was dry and furred. Her chest was normal on clinical examination. Her abdomen was completely rigid and tender all over and on rectal palpation of the pouch of Douglas, but especially in the right hypochondrium. Bowel sounds were absent. Perforated peptic ulcer was diagnosed and laparotomy was done at 9 A.M. on the day of admission.



Posterior and inferior surfaces of liver, showing site of pregnancy.

Operation.—A small upper paramedian incision revealed dark blood in the peritoneal cavity. Four pints of blood and peritoneal exudate was removed during the operation. No cause was found in the upper abdominal organs palpable through the original incision, and the uterus was felt to be enlarged, with tumours on each side of it; the pelvis contained much blood. A lower abdominal paramedian incision showed that each ovary contained several small cysts and that the uterus was enlarged by fibroids. The cysts were removed, and the search for the origin of the bleeding was continued by enlarging the upper incision. Fresh bleeding was detected coming from the posterior surface of the liver normally in relation to the right kidney (see figure); it came

from a soft globular tumour 3 cm. in diameter. The tumour was enucleated with ease, and the bleeding from the resulting cavity in the liver was controlled by packing the cavity with 'Oxycel' gauze. The wounds were closed without drainage. Four bottles of blood were given during the operation, and the postoperative recovery was uneventful. Histological examination of the tumour showed a collection of chorionic villi and highly active trophoblastic tissue.

Follow-up.—When seen six months later the patient was in good health.

I wish to thank Mr. Bernard Williams for permission to publish, and Dr. H. Miller for the histological report.

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A TRANSFUSION ACCIDENT

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ON May 16, 1955, a woman, aged 27, aborted and a few hours later was transfused with two bottles of ABO incompatible blood. The error was discovered four hours after the transfusion had been completed, and the only early sign of a hæmolytic reaction was the secretion of black urine, discovered when the patient was catheterised before operation. She was immediately placed on the Bull régime; she developed oliguria, nitrogen retention (blood-urea level 75 mg. per 100 ml.), jaundice (bilirubin 9·2 mg. per 100 ml.), and inadequate circulation (pulse-rate 150, blood-pressure 85/60 mm. Hg). After 54 hours she vomited and diarrhœa developed; so the strict Bull régime had to be abandoned and feeding by mouth begun; but next day, 72 hours after the transfusion, diuresis set in, and she thereafter made an uninterrupted recovery and was discharged on May 31.

The disappearance of the transfused cells was followed by Ashby's differential-agglutination method: free circulating anti-A was detected by agglutination of A cells by the recipient's serum, and anti-A adsorbed on recipient's cells by the direct anti-globulin method. The results are shown in the accompanying table.

Date in May	Direct anti-globulin test	Presence of B cells (Ashby)	Presence of anti-A	Volume of urine (ml.)
17	+ +	Not tested	Not tested	50
18	+ +	Not tested	Not tested	500
19	+ +	+	+	230
20	+ +	0	+	360
21	+ +	0	+	460
23	0	Not tested	0	1020

It is clear that foreign incompatible agglutinins derived from donor plasma remained in the recipient's bloodstream even longer than did the foreign red cells.

Technique

The patient had been admitted on May 11 and next day was grouped by the hospital blood bank as group B rhesus-positive, the cells being tested against known serum, and the patient's serum tested with known cells. When the duty pathologist was asked for blood he did not check the patient's group but took two bottles of group-B rhesus-positive blood from the store for cross-matching by the tube-centrifuge method. Agglutination took place in both tubes. The pathologist took two more bottles of group-B rhesus-positive blood and repeated the test, this time setting up a control with the patient's cells in her own serum; all the tubes showed agglutination, which he ascribed to an auto-agglutinin active at 37°C, although such auto-agglutinins are very rare whereas errors in ABO grouping, and non-specific clumping by centrifuging at too high a speed, are fairly common.

The pathologist then set up a routine cross-match in saline solution and albumin, both at 37°C, and set up cells and serum for the anti-globulin test, using the patient's cells in her own serum as an indicator for auto-agglutinins. However, when he visited the ward he concluded that the patient's clinical state warranted immediate transfusion; so after an hour's incubation he read the saline-solution cross-match, which showed no agglutination, and completed the anti-globulin test, which was also read as negative. He then issued the blood.

The blood was administered between 4.45 A.M. and 10 A.M. on May 17 and caused neither dyspnœa, backache, nor rigor; the incompatibility was discovered at 2.15 P.M., when the blood-bank staff checked all the night emergency work. It became clear that the patient's group was A and not B, and that the blood-bank staff had made an error on May 12. The original serum, which had been kept, was found to contain anti-B; so it must have come from a patient of group A. No explanation for this error could be found.

The cross-match had failed to demonstrate the error without ambiguity. When it was repeated with sera collected on May 12 and 17 against a 2% suspension of donor cells at room-temperature, there was strong agglutination, with a trace of hæmolysis only, but at 37°C there was well-marked hæmolysis in both tubes, and the residual cells were uniformly distributed except for a few clumps. Further tests with added guineapig complement showed that an anti-B hæmolysin active at 37°C was present in both samples of serum, causing almost complete hæmolysis at a titre of 1 and a trace at 4, whereas at room-temperature there was only a trace at 1. There was nothing to suggest an immune origin for this hæmolysin. A sample collected ten days after transfusion showed a hæmolysin titre of 16, and an agglutinin titre of 256, compared with a pre-transfusion value of 32.

Comments

This incompatible transfusion occurred because:

(1) The technical staff of the bank made an error in ABO grouping.

(2) The duty pathologist believed the bank's result and did not check it even when he got unexpected results.

(3) He set up the saline-solution cross-match at 37°C instead of at room-temperature and did not recognise the hæmolysis.

It follows that:

(1) Since auto-agglutinins active at 37°C are very rare, if their aid must be invoked to explain the results of cross-matching tests a gross error has probably been made.

(2) The most probable error in such a case is an error in ABO grouping, usually of the recipient. This can be checked on the tile in a few minutes. If the recipient's ABO group is correct, that of the donor should be checked, with special attention to the possibility of A_2.

(3) Hæmolysis in a cross-match usually indicates an ABO incompatibility; this can be confirmed by a slide test or, more slowly, by a saline-solution test at room-temperature.

(4) The saline-solution cross-match should be kept at room-temperature, where it will easily identify anti-A, anti-B, anti-M, anti-H, and anti-P; it should not be incubated at 37°C, where hæmolysins may be active.

We wish to thank Dr. W. J. Clancy and his staff for their full coöperation, and Dr. George Discombe for his invaluable help throughout.

Preliminary Communication

DETERMINATION OF FŒTAL BLOOD-GROUP

BY examining the desquamated cells in the amniotic fluid for the specific sex chromatin discovered by Barr and his associates,[1] it has become possible to diagnose the sex of a fœtus. This method has been described by two of us,[2] and independent development of the method simultaneously in various parts of the world has amply confirmed its reliability.[3–6] We have since tried to develop a method for determining the fœtal blood-group, and we report here the preliminary results of antenatal ABO-grouping in the last months of pregnancy from desquamated cells in the amniotic fluid.

If the fœtal blood-group can be determined as early as the sex—i.e., from the fourth month of pregnancy—and amniotic fluid can be withdrawn at this stage without disturbing the pregnancy (which we believe but have not yet proved), then it will be possible to diagnose both sex-linked and blood-group-linked hereditary diseases at a stage when pregnancy can be safely interrupted.[7]

No simple and reliable method for determining the blood-group from tissue cells was available until Coombs and his co-workers recently described a method by which A and B antigens could be demonstrated on human epidermal cells by mixed agglutination.[8] Coombs et al. believed that this method could be applied to most tissue

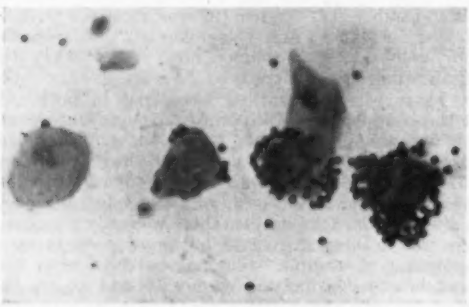

Fig. 1—Mixed agglutination of erythrocytes and amniotic-fluid cells. Cells do not all participate in agglutination.

cells and thus afford a useful tool in studies of the antigenic structure of tissue cells. In our hands, this method has made it possible to detect A and B antigens in the cells of amniotic fluid, all of which are of fœtal origin.

Amniotic fluid was obtained by inserting a catheter into the amniotic cavity from below in cases where labour was to be induced, and by transabdominal puncture in a case of hydramnios. 2–5 ml. of each sample was centrifuged for three minutes at 1500 r.p.m. in silicone-coated conical glass tubes. The vernix and the supernatant were removed and the cellular sediment was resuspended in Ringer's solution and centrifuged again. This procedure was repeated once or twice. 10 drops of a suitable cell suspension was then incubated for one hour at 20°C with a similar quantity of anti-A immune serum, and another aliquot with anti-B serum. After this the samples were centrifuged again for three minutes, and the sediments were washed twice with Ringer's solution. Erythrocytes of groups A, B, and O were washed twice, and 1% suspensions with Ringer's solution were made. 4 drops of the cell suspensions was then mixed with similar amounts of the erythrocyte suspensions in silicone-treated test-tubes in the following way:

(1) Amniotic cells incubated with anti-A + A erythrocytes.
(2) Amniotic cells incubated with anti-B + B erythrocytes.
(3) Amniotic cells incubated with anti-A + O erythrocytes.
(4) Amniotic cells incubated with anti-B + O erythrocytes.

The tubes were centrifuged and the sediments were then carefully resuspended in the supernatant by gently shaking the tubes. A drop of each cell-erythrocyte mixture was inspected on a slide under cover with an ordinary light microscope or a phase-contrast microscope.

Where agglutination occurred, appearances very similar to those described by Coombs et al.[8] were seen (figs. 1 and 2). The erythrocytes adhered in large numbers to

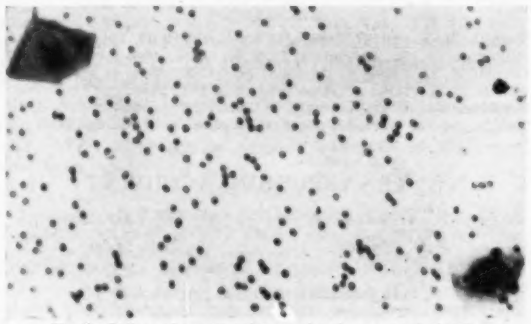

Fig. 2—Cell-erythrocyte mixture showing no agglutination.

the surface of the much larger amniotic-fluid cells, but no agglutination of erythrocytes or of cells alone was seen. When agglutination occurred in mixture no. 1, a fœtal blood-group of A was diagnosed; agglutination in mixture no. 2 was diagnosed as group B; agglutination in both as group AB; and no agglutination as group O. No agglutination occurred in mixtures nos. 3 and 4 in any instance, thus providing a control.

So far we have studied twelve samples of amniotic fluid, six of which were examined by two of us independently of each other. One sample was found at the first centrifugation to contain blood; contamination with maternal blood was assumed, and this was confirmed by the subsequent examination. In one case very weak agglutination was obtained in mixture no. 1 by both investigators. Postnatal blood-grouping of umbilical-cord blood indicated group A. In all the remaining cases except one the results agreed with the blood-groups determined postnatally on cord blood. Only in one case did one of the examiners fail to obtain agglutination in mixture no. 2, where the blood-group later turned out to be B. In two instances one of us saw slight erythrocyte agglutination in cases of group O, but no mixed cell-erythrocyte agglutination which alone is taken as a positive test.

Although the number of samples is small there is no doubt that the fœtal ABO blood-group can be diagnosed by this method. How early in pregnancy it can be done is not known, nor has any attempt been made to determine the Rh-group as yet. A knowledge of the fœtal Rh-group would be of practical value in cases of Rh-immunisation. At present we induce labour in such cases about two weeks before term if the fœtus is estimated at 2800 g. or more; but even in cases where the mother has a high titre of antibodies the fœtus may be Rh-negative, and antenatal diagnosis of the Rh-group would make it possible to avoid induction of labour in such cases.

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Reviews of Books

Peopling the British Commonwealth

G. F. McCLEARY, M.A., M.D. Camb. London: Faber & Faber. 1955. Pp. 174. 18*s*.

INTEREST in demography tends to be limited to specialists. But the facts it reveals are the concern of us all, as Dr. McCleary proves in his balanced survey of the population problems of Britain and the Commonwealth. Vital statistics are often dull reading, but he tells his story with skill and a wealth of interesting historical detail. By collecting in readable form facts and opinions which are difficult of access to the general reader, he has made a useful contribution to the understanding of problems which are being increasingly forced on public attention.

Dr. McCleary has deliberately confined his book to countries with immigration potential. After sketching the historical and political background, he follows the tangled threads of the birth and death rates, and of immigration and emigration since the end of the last century, first in Britain, then in each of the four Dominions. In 1883 Seeley predicted that within fifty years the white population of these countries would exceed 100 million. In fact, seventy years later, it is still only 79 million, and, relative to resources, the distribution is unbalanced. Tracing causes and consequences, Dr. McCleary shows how voluntary birth prevention has limited the development which was so confidently forecast. Can the Commonwealth survive as a viable unit unless the birth-rate rises above replacement-level? What can be done to redistribute the overcrowded population of Britain to the underpopulated and underdeveloped Dominions? To these questions Dr. McCleary propounds no dogmatic answers. He surveys the alternatives and leaves conclusions to the reader, indicating only his preference for planned mass emigration and his realisation that our collective future may depend on switching the contemporary preference for material pleasures to the less immediate but more lasting happiness of a fuller family life.

An Outline of the Cytology and Pathology of the Reticular Tissue

A. H. E. MARSHALL, Freedom research fellow, Bernhard Baron Institute of Pathology, London Hospital. With a chapter on the Lipidoses by J. B. CAVANAGH. Edinburgh: Oliver & Boyd. 1956. Pp. 274. 116 illustrations. 42*s*.

Dr. Marshall combines a factual account of our knowledge of the reticular system with a critical appraisal of the many hypotheses which veil the important gaps waiting to be filled in. He is not afraid to express his own views, which are based on the records of the London Hospital and the Oxford Lymph Node Registry and supported by his own experimental work. At the same time he is commendably cautious in his comparison of human reticuloses and experimental reticuloses in animals.

He pays much attention to the often overlooked work of Hortega and de Asúa (1921 and 1924) on the presence of microglia-like cells in organs other than the brain. This is the essential starting-point of his work; for he has demonstrated, mainly by the Weil-Davenport technique, the presence of "metalophil" cells throughout the reticular system and in such unexpected places as the advancing edge of the histological tubercle.

In reviewing the various clinical and histological types of reticuloses and reticulosarcoma, he largely follows Robb-Smith: he seems to favour classification by further analysis rather than synthesis. His account of 30 cases of lymphohistiocytic medullar reticulosis (Robb-Smith 1947), of the Kurloff cell, of Boeck's sarcoidosis, and of mycosis fungoides are particularly helpful: of this last disease he insists that the diagnosis should be reserved for cases with a typical clinical course and a predominant skin localisation and should not be applied to examples of generalised reticular tissue neoplasm in which some dermal infiltration has taken place.

Dr. Cavanagh, of Guy's Hospital, contributes a chapter on the lipid storage diseases which helps to clarify a subject which is becoming increasingly confused.

The illustrations of this stimulating book are of a high order.

Office Procedures

PAUL WILLIAMSON M.D. Philadelphia and London: W. B. Saunders. 1955. Pp. 412. 87*s*. 6*d*.

THE title suggests to the British reader that this book is written for the business man: in fact, it is full of useful medical information. The American doctor's "office" is equipped on a more ambitious scale than is usual in this country, and the procedures which are carried out there include many customarily delegated here to the minor-operation theatre or hospital ward sideroom.

Each section contains clear accounts of all the manipulations, manœuvres, diagnostic tests, and procedures likely to crop up in general practice. The section on pædiatrics, for example, deals, among other things, with treatment of birth fractures and injuries, venepuncture, lumbar puncture, examination techniques, numerous sideroom tests, management of herniæ, hydroceles, immunisation and vaccination techniques, and circumcision. The other sections are built up in the same way, and those on minor surgery, proctology, gynæcology, and the musculoskeletal system are particularly comprehensive.

Clear line drawings help the text, and those in the section on minor surgery are especially good. They show that, though his equipment would be considered generous in this country, the author can improvise shrewdly, finding many uses for an item of equipment found in any "office"—the straightened paper-clip.

Dr. Williamson has enjoyed writing his book. He writes easily and well, wisely and wittily. His book will find eager readers in every casualty department, and among those in group practice. It will appeal also to single-handed general practitioners who have a theatre and some occasional help to turn to.

The British Pædiatric Association, 1928–1952

H. C. CAMERON, F.R.C.P. London: British Pædiatric Association. 1955. Pp. 107.

THIS is the story of the first twenty-five years of the British Pædiatric Association. The association is as fortunate in its choice of a historian as it has been in so many of its activities. Dr. Cameron, the biographer of Lord Lister and Sir Joseph Banks and the historian of Guy's Hospital, has written this account of the pædiatricians with delightful grace. The birth of the association is portrayed in the frontispiece drawing by Mrs. Donald Paterson, in which her dynamic husband, with James Spence in the wings, is persuading a doubtful Dr. Still to give the project his authoritative blessing.

The newborn association began as a friendly clinical club and has continued, in the atmosphere of Windermere, to maintain this spirit while developing its medico-political responsibilities. Dr. Cameron's story makes it plain that this remarkable fusion of objectives was achieved by the devotion of the men who directed the association's development, such as Frederic Still, Leonard Parsons, and James Spence, their work now completed; and Robert Hutchison, Charles McNeil, Cameron himself, and Donald Paterson, still exerting a friendly influence.

The book concludes with obituaries in which the author (unlike that famous Guy's man, Samuel Wilkes, whose *vale* to departed colleagues was said to "add a new terror to death"), by his appreciation of the good in the men he describes, makes it appear an "easy and pleasant thing to die." This history happily records the work of a generation who created, we may hope, an enduring tradition for pædiatrics.

International Review of Cytology

Vol. IV. Editors: G. H. BOURNE and J. F. DANIELLI. London: Academic Books. Pp. 396. $9.

THE editors have again ranged widely in their choice of topics—from micromanipulative technique to electrochemistry.

M. J. Kopak describes the triumphs of instrumentation by which he is able to investigate the enzymatic activity contained in one-millionth of a c.mm. of cytoplasm; so much has been achieved in this direction that when the writer states that "it is theoretically possible to identify a single

enzyme molecule" the reader is inclined to accept the practicability of doing so as well. The second essentially technical paper is by M. Wolman and is a useful critical discussion of the mode of action of fixatives and their effects on tissues as subsequently visualised. Two interesting communications deal with bacterial morphology; in the first A. Marshak discusses the bacterial analogues of the cellular inclusions of higher organisms, and in the other R. Vendrely discusses from a histochemical point of view the staining characteristics of bacteria, and includes a consideration of the basis of Gram-staining.

The papers by D. P. Hackett on plant mitochondria, and by K. Mühlethaler on the structure of chloroplasts are most timely in relation to recent biochemical work on the pathways of photosynthesis. N. B. Kurnick's review of the histochemistry of nucleic acids is notable for a good discussion of the pitfalls of photometric measurements on histological preparations, while R. Couteaux's chapter on the localisation of cholinesterases contains some splendidly reproduced photographs and drawings—although the element of subjectivity in drawings is, as always, difficult to evaluate.

The contribution by L. E. Wagge on amœbocytes concentrates on those of molluscs and is in the descriptive tradition; similarly that of H. Moe on goblet cells is also broadly descriptive histology, but it includes some quantitative data on the distribution of such cells in the intestine of the cat, though the significance of these data is not altogether clear. The remaining papers comprise an informative but inconclusive account of the structure and chemistry of nucleoli by W. S. Vincent and a short note by E. J. Conway which summarises recent studies on the redox-pump theory of ion transport.

This work is not, of course, addressed primarily to a medical public, but the histochemical sections of the book are likely to be very valuable to pathologists who are not specialists in this branch of histology, while many of the other sections will appeal to bacteriologists and biochemists.

Tropical Medicine for Nurses

A. R. D. ADAMS and B. G. MAEGRAITH, School of Tropical Medicine, Liverpool. Oxford: Blackwell Scientific Publications. 1955. Pp. 314. 30*s*.

THE nursing profession now has a more substantial volume on tropical medicine than hitherto. For many years the staff of the Liverpool School have taught this subject to general-trained and registered hospital nurses before they went overseas, and it is for them that this book has been written. It is definitely not a book on nursing, but it gives an idea of what they may have to contend with in isolated stations in the tropics. The subjects are arranged in alphabetical order and each disease is dealt with simply but adequately. The 32 figures are very clear and well produced, and the book is admirably suited to its purpose.

Bibliotheca Walleriana

A Catalogue of the Erik Waller Collection. Vols. I and II. Compiled by HANS SALLANDER. Stockholm: Almqvist & Wiksell. 1955. Pp. 1000. Sw. Kr. 200.

THE Royal University Library of Uppsala was greatly enriched in 1950 when the Swedish surgeon, Erik Waller, presented his library. It contains almost all the major medical works published before 1800, as well as a highly representative selection of later literature. The famous collections of Osler and Cushing each comprised some 8000 items, but Waller's includes nearly 21,000, and is also superior in quality.

The main part of the library consists of old medical literature, including numerous rare and unique books. These, together with the 150 incunabula, form the first volume of the catalogue. The second volume deals mainly with literature of the natural sciences, the history of medicine and science, biography, bibliography, and various other subjects, including the collected works of famous scholars and scientists. The items are listed under full titles. Unfortunately there are no annotations; but they would have been an immense job and would have greatly increased the cost.

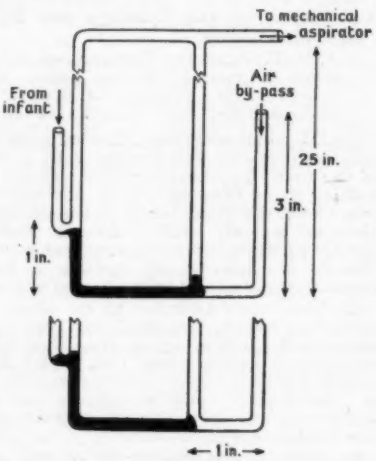
These volumes will be useful to medical and scientific libraries as a check list for exact titles and editions. In these days of photo-copying, a catalogue of this kind often reveals the location of a rare book. The production of the two volumes is excellent.

La Lèpre (2nd ed. Paris: Expansion Scientifique Française. 1955. Pp. 310. Fr. 3800).—In this book Dr. Roland Chaussinand, of the Pasteur Institute, has drawn from his own considerable experience in Indo-China and has added much of value from the work of others. He has substantially enlarged the 1950 edition, and he gives a sound and lucid description of the disease, its history, epidemiology, bacteriology, immunology, prophylaxis, and treatment. There are 130 excellent photographs, of which 18 are coloured, and a comprehensive bibliography. He condemns compulsory segregation, calling it "illogical, ineffective and dangerous," and he emphasises the importance in prophylaxis of case-finding and early treatment. He also develops his view that tuberculosis and leprosy, by virtue of the relative cross-immunity they produce, are mutually antagonistic diseases; and he brings the reader up to date on B.C.G. in the prevention of leprosy. In his chapter on treatment he clearly states his preference for D.D.S. (diaminodiphenyl sulphone), and deals comprehensively with other aspects such as physiotherapy and surgery. It is a pity that so little space is devoted to the histology of leprosy and to describing reactive states: there is only a fleeting reference to erythema nodosum leprosum, and Lucio's phenomenon is not mentioned. Further, many leprologists will disagree with the view that borderline cases always evolve from major tuberculoid and can therefore be considered benign, particularly since 100% have positive skin smears, 86% are negative to lepromin, and the majority become lepromatous. These criticisms apart, this is a concise and informative work.

New Inventions

A MUCUS-ASPIRATOR FOR INFANTS

THERE is little doubt that a thorough clearance of the upper respiratory passages is the most important measure in the resuscitation of the newborn. This is most commonly achieved by swabbing the mouth and aspirating mucus. While this is being done the attendant often sucks and blows through the extractor, which consequently becomes contaminated by micro-organisms.



Most of the mechanical aspirators designed for suction of the adult respiratory passages are capable of a suction force of 650 mm. Hg, which is sufficiently strong to cause serious damage to the pharyngeal mucosa of the newborn.

A mucus-aspirator has been designed (see figure) with a "mercury break" introduced between the mechanical force of suction and the infant. When the suction force rises above 25 mm. Hg, air enters through the by-pass and the pressure returns to atmospheric. The oscillation of the column of mercury produces gentle intermittent suction.

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1. LANCET, 1954, 2, 942. 3. B.M.J., 1954, 2, 1256.
2. B.M.J., 1954, 2, 1267. 4. LANCET, 1954, 2, 1245.

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THE LANCET

LONDON: SATURDAY, JUNE, 23, 1956

Radiation Hazards

OF the grave questions which faced the Medical Research Council's committee on radiation hazards, two stand out. Are X rays, as used in medicine today, harmful to the patient or his progeny? And what are the possible effects, both on the race and on the individual, of the continued explosion of thermonuclear weapons? Inevitably the committee had often to base their conclusions on incomplete evidence, and much remains uncertain. But by presenting their findings (and their reservations) so plainly, they have made it much easier to see how things stand.

The report published last week [1] gives a reasoned and informed assessment of the risks to individuals and to populations. Though information on human and mammalian genetic effects is scarce, the committee have tried to place the genetic risks in reasonable perspective. In estimating the contribution of the various man-made sources of radiation to the population gonad dose, they have taken as their base-line the natural or background radiation, which has been relatively constant during man's evolution. The dose to the gonads from all natural sources has been put at 0·1r per year or about 3·0r per generation of thirty years,[2] and in this country man has probably increased this dose by at least 25% in the past fifty years by his use of ionising radiations. Genetic damage is irreparable and cumulative, and, since it is the frequency of gene mutation which is increased by radiation, the rise in the mutation-rate is directly proportional to the radiation dose received by the gonads. Radiation has, of course, no genetic effect after the age of reproduction, but all radiation received by the germ-cells and their ancestors before conception is effective and cumulative. The committee find nothing to suggest that radiation-induced mutations will be in any way novel—or beneficial. In all probability the mutations to be expected in man as the result of this increased exposure will be qualitatively the same as those already arising spontaneously.

The committee were unable to give a figure for the population gonad dose from radiotherapy; it is believed to be considerably less than that from diagnostic radiology, but greater than from any other source. Diagnostic radiology contributes to the population as a whole a radiation dose not less than 22% of that from background sources. Mr. OSBORN and Mr. SMITH reported in our columns last week the results of their preliminary survey in England and Wales on which this disturbing figure is based. Their survey shows that the annual total of diagnostic X-ray examinations is much higher than had previously been supposed; and the American committee which has been examining the situation in the United States have been likewise startled by their own findings. (Some extracts from the American report appear on p. 1007.) On an average, 1 examination is performed every two and a half years on everyone in England and Wales. The survey was designed to estimate the minimum contribution of diagnostic radiology to gonad dose in the "genetically alive population"—that part of the population who may become parents. This period of risk extends from the conception of the parent to the conception of his or her last child. Diagnostic radiology's contribution of not less than 22% of the background dose is several times larger than that from any other source of artificial radiation. And this is a minimum estimate. Mr. OSBORN and Mr. SMITH emphasise that the actual dose to the gonads of the "genetically alive" population is greater than their estimate, though whether it is two or five or ten times greater they cannot yet say. Whatever the true figure is, it is clearly formidable. Nearly three-quarters of this dose, it seems, comes from a few types of X-ray examination which make up only 7% of the total number of examinations. This potentially dangerous group consists in examinations of the hip, femur, lower abdomen, and lumbar spine, and pyelography and pelvimetry. The committee recommend that the time has now come for a review of present practice in diagnostic radiology, "both from the point of view of the dose distribution over the population as a whole and from the point of view of the special risks to individuals associated with examinations involving heavy exposure." As the report says, a great deal can be done. The number of X-ray examinations can be reduced, particularly in young people; and the dose can be cut by more careful radiography, stricter definition of the beam, and the rapid introduction of modern techniques, such as image intensification.

Fall-out from test explosions of nuclear weapons adds, at the moment, less than 1% to the background level of radiation; and this source is not, the report says, an appreciable genetic hazard—at the present rate of firing. The American report reaches the same conclusion. But a very few thermonuclear explosions have made an appreciable addition to the dose, and, if the rate of firing increases, the dose will rise in proportion. In dealing with the effects of fall-out on individuals (as opposed to the genetic hazards), the M.R.C. report rightly emphasises that we know very little about the possibilities. We have some evidence that patients with ankylosing spondylitis who have had radiotherapy are more liable to leukæmia than those not irradiated. But we are particularly ignorant of the consequences of long-continued irradiation by low doses, whether from external sources or from radioactive substances that have been swallowed or inhaled and then incorporated in the body tissues. From this point of view, the most sinister constituent of fall-out from hydrogen bombs is the radioactive isotope, strontium 90. Since strontium is soluble and behaves rather like calcium, it will be absorbed by mouth and retained in bone. Strontium 90's long half-life of twenty-eight years will then ensure a high radiation dose to bone. Measurements of the strontium content of human bone have been made in this country to see what the bombs so far exploded have done. In an appendix to the M.R.C. report, Dr. W. G. MARLEY records that the maximum activity so far found in Britain was in the skeleton of a one-year-old child, which contained 1·2 micromicrocuries per g. of calcium. Adult bones which have been measured showed lower activities, ranging from

1. The Hazards to Man of Nuclear and Allied Radiations. Cmd. 9780. H.M. Stationery Office. Pp. 128. 5*s*. 6*d*.
2. Spiers, F. W. See *Lancet*, June 2, 1956, p. 839.

0·05 to 0·2 micromicrocuries per g. of calcium. It is not surprising that the highest activity was in a child, since growing bone, compared with adult bone, takes up more bone-seeking isotopes. Samples of sheep bones contained 14 micromicrocuries per g. but in a few mountain pastures figures were up to ten times greater.

So far as we know, the M.R.C. committee and the International Commission on Radiological Protection have no records of human damage attributable to strontium. In making their recommendations, therefore, they have had to extrapolate from animal work and from the scanty records of human radium poisoning. The International Commission recommended that the body burden of radium should not exceed 0·1 microcuries for persons exposed to radiation at work; and it is known that a large safety factor was not included in this figure. Easily recognised radiographic bone changes have been recorded in patients with body burdens of from 0·4 microcuries of radium upwards; and radium produced a bone sarcoma in a person with a burden of 3·6 microcuries.[3] These effects of radium usually appear after very long latent periods of ten or twenty years. Larger body burdens may, of course, be associated with different and earlier changes, as in the American dial painters [4] who had massive bone necroses, infections, and aplastic anæmia (these "aplastic anæmias" might today have been diagnosed as acute aleukæmic leukæmias). Though damage by ingested radium in man has been known for many years, there are as yet no data on the ultimate results of long-continued low-level activity from ingested radium in a "closed population"—i.e., one which has been followed up to extinction. There is, therefore, no evidence about the possibility of premature ageing or chronic ill health in man as a result of irradiation. Such changes have been observed in animals.[5] It is hard to say how radium and strontium compare, but the biological effects in bone of alpha-particle emission from radium are probably greater than the beta-radiation from strontium-yttrium decay. In view of this difference the International Commission recommended a higher maximum permissible body burden for strontium than for radium—namely, 1·0 microcuries for those occupationally exposed. This corresponds to 1000 micromicrocuries of strontium per g. of calcium in the skeleton, which is about a thousand times greater than the most heavily contaminated bones yet examined. But the M.R.C. committee declare that "immediate consideration would be required if the concentration of radioactive strontium in bone showed signs of rising greatly beyond that corresponding to one hundredth of the maximum permissible occupational level." In other words, if it goes above 10 micromicrocuries per g.

If, in fact, poisoning reaches that level it is likely to do so first in young people with growing bones. It is also reasonable to suppose that, apart from this age difference, the whole population would be equally affected. It seems that the fall-out of thermonuclear explosions is deposited at the rate of 10–20% per year, so that strontium would continue to find its way into bone for years after the "alarm level" had been reached. No doubt this is one of the reasons for the guarded words which the M.R.C. committee use about the hazards of fall-out from test explosions. They say that the hazards from external radiation due to fall-out are so far negligible; and no detectable increase in the incidence of ill effects is to be expected from internal radiation by radioactive strontium at its present level. But if the rate of firing, particularly of thermonuclear weapons, increases, harm may be done in a small proportion of the population. The report makes no estimate of how big an increase in the rate of firing would be required to produce the first detectable, and presumably gross, damage. This question of poisoning by strontium 90 is one on which the medical profession, like the M.R.C. committee, can only advise on the possible results of continued exposure. It is the committee's view that, with proper safeguards, exposure from all sources in peacetime can be maintained at levels which can be accepted by the citizen "without undue concern either for himself or his offspring." But unless the safeguards include the stopping of further thermonuclear tests, is this conclusion justified? By the time we have gathered sufficient evidence to assess more accurately the danger of strontium-90 poisoning, it may be too late to prevent disastrous consequences.

3. Looney, W. B., Hasterlik, R. J., Brues, A. M., Skirmont, E. *Amer. J. Roentgenol.* 1955, **73**, 1006. See also Recommendations of the International Commission on Radiological Protection. *Brit. J. Radiol.* 1955, suppl. no. 6.
4. Martland, H. S. *Proc. N.Y. Path. Soc.* 1926, **26**, 65; *J. Amer. med. Ass.* 1929, **92**, 466, 552; *Amer. J. Cancer*, 1931, **15**, 2435.
5. Blair, H. A. U.S. Atomic Energy Commission Report, 1953, p. 227; *Ibid*, 1954, p. 312.

Pyelonephritis

PYELONEPHRITIS is the commonest disease of the kidneys.[1] In some forms, such as "pyelitis" of children, its course is relatively benign; and acute attacks in the adult can readily be controlled, after identification of the causal organism, by appropriate treatment. Recurrent and chronic attacks, however, are very resistant to treatment. On p. 973 this week, Dr. JAN BROD points out that, while chronic pyelonephritis is the commonest cause of deaths from renal failure in Prague, two-thirds of the cases had escaped clinical recognition. In an attempt to improve this situation, Dr. BROD compared the clinical features of 132 cases of chronic pyelonephritis, 54 of chronic glomerulonephritis, and 16 of vascular nephrosclerosis; and his inquiry throws welcome light on a confused subject. The well-known diagnostic points were not always as helpful as expected: pathogenic organisms were grown from the urine in 81% of cases of chronic pyelonephritis, but also from 50% of cases of chronic glomerulonephritis. On the other hand, a large excess of white blood-cells was found in the urine of 76% of those with pyelonephritis, as opposed to only 14% in glomerulonephritis and vascular nephritis. Otherwise, the most helpful and easily determined abnormality was a long-continued loss of renal concentrating power, quite out of proportion to the degree of impairment of the glomerular filtration-rate. This disorder of the distal tubules included decreased ability to save base (Na), and there was a tendency towards dehydration, decreased alkali reserve, and acidosis. Another point of diagnostic importance was a striking difference in the function of the two kidneys in chronic pyelonephritis, as assessed by ureteric catheterisation, using the concentrating index of endogenous creatinine $\left(\frac{U}{P} \text{ ratio}\right)$; the difference was insignificant in normal kidneys and in those affected by chronic glomerulonephritis

1. Weiss, S., Parker, F. jun. *Medicine, Baltimore*, 1939, **18**, 221.

or vascular nephrosclerosis. X-ray examination, and especially serial examination, in chronic pyelonephritis, often showed differences in size and density of renal shadows and in spread and evacuation of contrast medium. Consideration of these points would undoubtedly help towards more widespread recognition of the condition.

The clinical picture has been correlated with the common pathological finding of irregular superficial depressions associated with wedge-shaped scars through the kidney parenchyma [1–6]—a type of lesion sometimes ascribed to ischæmia [7] or developmental dysplasia.[8 9] The possible relation of these scars, and therefore of pyelonephritis and the resulting vascular changes, to a type of hypertension [1 3 5 10] is of the first importance. Experimental evidence now provokes further thought on this subject. DE NAVASQUEZ [11 12] found that when gram-negative bacilli were injected intravenously into animals with normal kidneys, the organisms did not leave the blood-vessels but passed through the organ harmlessly and never appeared in the urine. But when coagulase-positive *Staphylococcus aureus* was injected, pyelonephritis followed and renal scarring developed with the same features as the human disease: localisation of the organisms was presumably due to diffusion of coagulase from the plasma to produce coagulative necrosis in the surrounding tissues, thus enabling the organisms to multiply in a presuppurative phase before the phagocytes could reach them. In animals which had survived a staphylococcal infection and had presumed scars (later confirmed), intravenous injection of gram-negative bacilli of the coliform group invariably produced an acute pyelonephritis which was fatal within two weeks. The kidneys showed asymmetrical contraction, with coarse stellate scars resulting in an intrarenal hydronephrosis. In addition to these old scars, there were linear abscesses in their immediate vicinity, the purulent exudate being confined to the distended tubules; and the pelvis showed patchy inflammation. It seemed that the intrarenal hydronephrosis resulting from the first infection had slowed the blood-stream sufficiently for the second infecting organisms to multiply and produce suppurative lesions. This was further evidence that, in kidneys without mechanical defects, infarctions, or atheroma, these stellate scars were the result of hæmatogenous pyelonephritis. DE NAVASQUEZ pointed out that the primary staphylococcal infection in the rabbit, with appropriate dosage of organisms, was self-limiting and left no clinical evidence, but it enabled the gram-negative bacilli to settle out in the kidney when they would not otherwise have done so. But we must not conclude from these animal experiments that in man a previous infection must be staphylococcal before a coliform infection can take hold. Moreover, the way in which these animals were infected (20–100 million bacilli were injected into an ear vein) is artificial and gives no clue to the method of infection in man. The secondary infection in the rabbit led to death from progressive uræmia and anuria, but, as DE NAVASQUEZ explained, this is because the rabbit's kidney is monopyramidal, and obstruction at the single papilla by a small lesion can affect all the collecting tubules, whereas the multilobular human kidney has a much greater margin of safety.

The development of these scars was also examined by HEPTINSTALL and GORRILL,[13] who injected *Staph. aureus* into rabbits, some of which were kept alive with penicillin. They then examined the kidneys at intervals up to four months. Again, the naked-eye and microscopic appearances were very similar to the scars attributed to pyelonephritis in man. HEPTINSTALL and GORRILL then produced a unilateral pyelonephritis with a coliform organism by temporary occlusion of one ureter [14 15]—a procedure which localised the infection to the affected kidney while the other remained normal. After three days the ureter was released and, either then or at periods up to four months, the normal kidney was removed. In this group of animals, the blood-pressure was measured at least twice weekly. It was found that there was no elevation of blood-pressure with a unilateral infection when the opposite kidney was intact; and even when it was removed, the blood-pressure rose only when there was considerable scarring in the affected kidney. In the scarred areas in all kidneys infected for over forty days, arteries and arterioles seemed to have increased in numbers, merely because of the disappearance of tubules. The only structural change in the vessels was an increased cellularity of the media in the older infections, and nothing significant was found in animals with high blood-pressure. It may well be that the design of the experiment did not allow the high pressure to continue long enough for changes to develop. Thus, in the animals, a rise in blood-pressure was due, not to vascular changes, but to extensive scarring in a remaining single kidney.

Patients with chronic pyelonephritis do not necessarily develop hypertension. Of LONGCOPE'S [16] patients with chronic pyelonephritis, those without hypertension had normal vessels and some with severe hypertension had vessels with slight changes. WEISS and PARKER [1] formed a more definite view from their cases of chronic pyelonephritis; mild proliferative vascular changes were associated with normal blood-pressure, and severe changes were almost always associated with severe hypertension. On the other hand, GOLDRING and CHASIS [10] found evidence that pyelonephritis did not cause hypertension; for hypertension was not more frequent in their patients with pyelonephritis than in those without. From their study of 11 kidneys removed for hypertension and found to show scars of chronic pyelonephritis, PICKERING and HEPTINSTALL [5] concluded that the renal lesion was sometimes the cause of the hypertension, but the evidence regarding the separate responsibility of the pyelonephritis and the vascular changes was too conflicting for either to be held

2. Gibson, A. G. *Lancet*, 1928, ii, 903.
3. Longcope, W. T., Winkenwerder, W. L. *Bull. Johns Hopk. Hosp.* 1933, **53**, 255.
4. Platt, R., Davson, J. *Quart. J. Med.* 1950, **19**, 33.
5. Pickering, G. W., Heptinstall, R. H. *Ibid*, 1953, **22**, 1.
6. Enticknap, J. B., Joiner, C. L. *Brit. med. J.* 1953, i, 1016.
7. Gaskell, J. F. *J. Path. Bact.* 1911–12, **16**, 287.
8. Ask-Upmark, E. *Acta Path. microbiol. scand.* 1929, **6**, 383.
9. Marshall, A. G. *J. Path. Bact.* 1956. **71**, 95.
10. Goldring, W., Chasis, H. Hypertension and Hypertensive Diseases. New York and London, 1944.
11. De Navasquez, S. *J. Path. Bact.* 1950, **62**, 429.
12. De Navasquez, S. *Ibid*, 1956, **71**, 27.
13. Heptinstall, R. H., Gorrill, R. H. *Ibid*, 1955, **69**, 191.
14. Lepper, E. H. *Ibid*, 1921, **24**, 192.
15. Mallory, G. K., Crane, A. R., Edwards, J. E. *Arch. Path.* 1940, **30**, 330.
16. Longcope, W. T. *Ann. intern. Med.* 1937, **11**, 149.

responsible. Dr. BROD's findings are that hypertension develops with increasing frequency as the pyelonephritis progresses, to the same degree as in chronic glomerulonephritis, though four times more often than in chronic cholecystitis (taken as a control for other chronic infections); his biopsy studies rebut the idea of a vascular cause, since vascular lesions were absent in 5 patients with grave hypertension. Malignant hypertension developed at an earlier age in pyelonephritis with hypertension than in essential hypertension, but only when the renal disease was far advanced. His results are in line with the experimental findings in suggesting that the onset of hypertension is determined by the lack of sufficient healthy renal tissue (or the presence of sufficient diseased renal tissue). Whatever the ultimate answer to these unsettled questions may be, all cases of pyelonephritis must be treated seriously and every resource must be used to eradicate the infection as completely as possible at the earliest opportunity.

Steroids in Anæsthesia

SOME years ago SELYE [1 2] demonstrated in rats the anæsthetic properties of 75 steroids with various structures. He noted that some compounds were potent anæsthetics but had little hormonal activity. Subsequently, hydroxydione (21-hydroxy pregnane-3, 20-dione sodium succinate), a water-soluble steroid, was shown experimentally to have a wide margin of safety and to be a likely drug for clinical use.[3] Indeed, work on various animals indicated that it has a therapeutic index considerably greater than that of thiopentone [4]; hydroxydione has no hormonal activity.[5] Under the name of 'Viadril,' it was first described in use as a clinical intravenous anæsthetic last year.[6] Although it is not a barbiturate, it lends itself to comparison with thiopentone, and other thiobarbiturates, because of its similar effects and method of administration. The early reports suggested that it had some advantages over these drugs both in its ability to produce greater relaxation without correspondingly increased medullary depression and in its seemingly specific action on the reflexes of the respiratory tract. But some later findings have been less encouraging, and the disadvantages of the new anæsthetic have become more apparent.

On another page this week Dr. GALLEY and Dr. ROOMS describe their experiences with hydroxydione; and pharmacological and other clinical investigations have lately been reported elsewhere.[5 7] From the start, it was realised that hydroxydione was an irritant, and in one series venous thrombosis followed in 15 out of 70 patients who received dilutions as low as 0·5% given as part of a freely running infusion. Dr. GALLEY and Dr. ROOMS find that 2·5 g. dissolved in a 540 ml. bottle of saline solution gives no trouble. These dilutions, however, necessitate the use of large volumes of fluid to get even a small quantity of the drug into the patient—a cumbersome method of inducing anæsthesia. More concentrated solutions cause pain (unless injected very slowly) and, commonly, thromboses. With the dilute solutions, loss of consciousness is slow, very closely resembling the onset of natural sleep but depending on the concentration, rate of injection, and state of the patient. Drowsiness may take as long as five minutes to appear, and sleep a further five minutes. The full anæsthetic effect is often not attained until fifteen or twenty-five minutes after the initial injection. A slightly quicker result can be achieved by speeding up the rate of injection, but hypotension may result. Experimental work on cats [7] suggests that the hypotension is caused by inhibition of the vasoconstrictor centres in the brain, coupled with a direct vasodilator action on the peripheral vessels themselves. But hydroxydione also depresses the ventricular muscle, though not so much nor for so long as an equivalent dose of thiopentone. Dr. GALLEY and Dr. ROOMS have observed hypotension, even in young patients, and an increased pulse-rate irrespective of a fall in blood-pressure. Respiration is seldom greatly influenced, but the volume may be reduced slightly and the rate increased.[7] Apnœa, such as is often caused by thiopentone, is very unusual. Investigation of the duration of action suggests that 1 g. lasts for about two and a half hours.[8]

There is little evidence that hydroxydione is an analgesic, and, under apparently deep anæsthesia with hydroxydione alone, sensory stimulation produces immediate reflex activity. This response is very similar to the reaction of patients under thiobarbiturates, such as thiopentone; and indeed electroencephalography has failed to show any difference between hydroxydione and these ultra-short-acting drugs.[5 9] These facts are substantially in favour of its classification as a hypnotic rather than as an analgesic. On the other hand, all reports have remarked on its selective depression of laryngeal and pharyngeal reflexes, without medullary depression. This action is the opposite of what may be expected under barbiturate anæsthesia, when many reflexes in this area are often exaggerated, and it is a big advantage for some operations. A further difference seems to be the remarkable sense of well-being and lack of fatigue during the first twenty-four hours after operation in patients anæsthetised with hydroxydione.

It is too early to assess the value of steroids in anæsthesia. Despite the valuable evidence given by Dr. GALLEY and Dr. ROOMS, many anæsthetists will not yet be convinced that hydroxydione has much to offer that cannot already be achieved with fewer disadvantages by existing drugs. Unless the anæsthetist takes the chance of venous thrombosis and hypotension by giving a more concentrated or more rapid injection, induction takes too long for all but major operations. Moreover the selective depression of respiratory-tract reflexes, when continued into the postoperative stage, may well increase the ever-present dangers of this period. Nevertheless the investigation of hydroxydione has opened up possibilities in a new line of anæsthesia which may well culminate in valuable additions to those drugs which have stood the test of time.

1. Selye, H. *J. Pharmacol.* 1941, **73**, 127.
2. Selye, H. *Endocrinology*, 1942, **30**, 437.
3. Laubach, G. D., P'an, S. Y., Rudel, H. W. *Science*, 1955, **122**, 78.
4. P'an, S. Y., Gardocki, J. E., Hutcheon, D. E., Rudel, H., Kodet, M. J., Laubach, G. D. *J. Pharmacol.* 1955, **115**, 432.
5. Howland, W. S., Boyan, C. P., Kuo-Chen Wang. *Anesthesiology*, 1956, **17**, 1.
6. Murphy, F. J., Guadagni, N. P., Debon, F. *J. Amer. med. Ass.* 1955, **158**, 1412.
7. Taylor, N., Shearer, W. M. *Brit. J. Anæsth.* 1956, **28**, 67.
8. Harbord, R. P., Wild, W. N. *Proc. R. Soc. Med.* 1956 (to be published).
9. Bellville, J. W., Howland, W. S., Boyan, C. P. *Brit. J. Anæsth.* 1956, **28**, 50.

Annotations

UPPER ALIMENTARY BLEEDING

BLEEDING from the upper alimentary tract is a problem which taunts us, sometimes diagnostically and always therapeutically. During the decade 1923–32 the mortality at the Massachusetts General Hospital due to massive hæmorrhage from acute ulcer was 13%, and it remained so during the years 1938–47: in 1948–53 it had risen to 17%.[1] Methods of blood replacement have improved immeasurably since 1932 and surgery has entered the therapeutic field as an emergency measure—all to no good, it seems. In the first memorial lecture before the American Gastroenterological Association, Dr. F. Avery Jones reported 39 deaths in 563 patients with bleeding from peptic ulcer during 1941–46 and 57 in 744 during 1951–54,[2] a mortality of approximately 7% in each group; and this has remained unaltered although operation was advised during the latter period for patients with recurrent bleeding, for those between 40 and 70 years old, and for those with chronic ulcers. Welch et al.[1] have shown that, in the Massachusetts series, only 8 patients were operated on in an emergency during 1923–32 and all 8 died, compared with 45 operations during 1938–47 with 22% mortality, and 100 operations during 1948–53 with 25% mortality. If the best that surgery can achieve gives a higher rate than the over-all mortality and does not reduce it, why switch to surgery? Brandon[3] is convinced that immediate gastrectomy is not the solution in the late stages of hæmorrhage, and he has had very encouraging results with adrenaline and Russell's viper venom given through a stomach-tube. If excessive bleeding recurs after this treatment, Brandon repeats it as a preparation for operation.

But the results of treatment of acute hæmorrhage are confused by the increasing age of the population. The proportion of Avery Jones's patients over 60 has risen from 33% in 1941–46 to 40% in 1951–54; and Welch et al. encounter massive bleeding in patients over 70 fifteen times more often now than was the case in 1932. Moreover, ulcer associated with hæmorrhage has been twice as common as a cause for admission in all patients in their sixth decade as in their fifth; and the mortality from bleeding increases steeply with age, being almost doubled (13–25%) from the sixth to the seventh decade. Thus, increasing age has spoilt the figures and at the same time has necessitated more operations, since in the view of Welch and his colleagues the elderly tolerate operation better than expectant treatment. Though Avery Jones's surgical policy has not reduced over-all mortality, there has been an improvement in patients under 60 and in those with chronic gastric ulcer.

If operation is to be performed, it is important to determine the site of bleeding before operation; and this may be by no means easy. Common sense and a knowledge of the probabilities are a fair guide: in the Boston series œsophageal varices accounted for 32% and duodenal ulcer for 38%. It is understandable therefore that Nachlas[4] should have found it a help in diagnosis to compare gastric and œsophageal aspirations after occluding the œsophagus at the level of the diaphragm by an inflatable balloon. But his apparatus would have little application in this country; in Avery Jones's series whereas 32% of admissions were due to duodenal ulcer only 2·7% arose from portal hypertension. Avery Jones uses gastroscopy to try to find the source of bleeding and he prefers this method to X-ray investigation. Should these measures fail and the source of blood is still not revealed by a proper examination at laparotomy of the cardia, the fundus, and the mucosa through an incision into the stomach, most surgeons perform partial gastrectomy since the undetectable lesion is commonly due to small erosions hidden within the folds of the stomach so that no tell-tale induration can be felt by the exploring fingers. But that is the kind of bleeding which Brandon has successfully treated with adrenaline and viper venom; and further experience with this method may reduce the indications for operation.

1. Welch, C. E., Allen, A. W., Donaldson, G. A. *New Engl. J. Med.* 1955, **252**, 921.
2. Avery Jones, F. *Gastroenterology*, 1956, **30**, 166.
3. Brandon, W. J. M. *Lancet*, April 7, 1956, p. 360.
4. Nachlas, M. M. *Surgery*, 1955, **38**, 667.

HELP FOR THE PSYCHIATRIST

DOCTORS and the community continue to learn more and more of the serious impact of mental illness on marital, social, industrial, and educational relations. As a result, an ever wider range of patients and conditions are referred to the psychiatrists, who are unable to deal adequately with all the patients sent to them. Nor are they equipped to meet the additional demands of society for guidance in the prevention and treatment of minor mental disturbance. Hopes have therefore been raised that much might be done on the spot by non-specialists if they commanded better knowledge of the working of the mind and simple psychotherapy. In this way social services would be greatly improved and a considerable burden might be lifted from psychiatric clinics.

At a meeting of the Tavistock Institute of Human Relations on June 15, Dr. J. D. Sutherland described the work of a group of psychiatrists specially trained in psychotherapy and interested in the application of their work to the problems of the community. He emphasised that one of the most pressing matters facing the National Health Service was how to deal with the vast amount of illness and unhappiness caused by psychological disorders. Anyone connected with a psychiatric clinic knew only too well the depressing situation created by the gap between the available therapeutic resources and the needs for treatment. There was also the great mass of psychological ill health which did not reach the psychiatrist. In psychiatric clinics, the need for more psychotherapy was paramount: the great difficulty, as Dr. Sutherland saw it, was that psychiatrists were often quite inadequately trained in psychotherapeutic skill. He did not think that increased opportunities for and training in psycho-analysis was the solution: "the therapeutic results of this form of treatment do not warrant such an expansion." At the Tavistock Clinic, therefore, attempts have been made to devise more economical psychotherapies, and group analytic methods are now offered as the main treatment to adult patients.

While general practitioners and doctors in maternity and child-welfare clinics can refer patients to psychiatric clinics for treatment, the hope of treatment there all too often proved vain. They were therefore forced to give rough and ready psychological help themselves, realising at the same time how much more they could do if only they knew how. Social workers, probation officers, social and industrial psychologists, and educationists found themselves in much the same situation. With more knowledge of psychology, they could greatly increase the efficiency of their work and often avoid sending patients to psychiatric clinics. Like general practitioners, Dr. Sutherland remarked, "they too know that if they cannot do it, there is little or no chance of it being done in the overburdened psychiatric clinics."

From the number of applications received for courses at the Tavistock Clinic, it was clear, Dr. Sutherland said, that many members of professional and non-professional groups were eager to increase their psychological skill. Two years of part-time training had been found to be the minimum for reasonable efficiency.

"The basic task during this period is for the trainee to learn to make adaptations in his or her own personality, in other words to get to know himself." Nothing approaching a personal analysis was envisaged—or indeed necessary. After training, "an essential feature of continuing practical work is the maintenance of an easily accessible personal relationship between the various groups and the consultants at the clinic. With such a permanent integration the case-worker's skill has increased to a quite remarkable level, and provides a safety net for all parties, the patient, the case-worker, and the consultant." Such contact need never be more intensive than once weekly, and often much less.

Dr. Sutherland felt that a few specially trained consultants working in the main centres would suffice to improve local services. He pictured close contact extending from the psychiatric clinic through general practitioners, public-health workers, health visitors, probation officers, social workers, marriage-guidance counsellors, educationists, and teachers—to fields far removed from clinical psychiatry proper. It is to developments of this kind that the Tavistock Clinic and the Tavistock Institute of Human Relations are planning to devote a substantial part of their efforts.

FINCHDEN MANOR

IN a new book [1] with a deceptive title more appropriate to an Edwardian novel, there is a serious contribution to the literature of psychological maladjustment, and its diagnosis and treatment. Written by a journalist in non-technical language, it is none the less of interest to teachers and psychiatrists as a remarkably clear and interesting account of the pioneer work of a residential establishment where Mr. G. Lyward has for many years been engaged on the rehabilitation of maladjusted adolescent boys. Finchden Manor is designed so that boys sent away from their schools "for delinquency, or for obvious mental sickness, should have a chance of being put right, instead of being left to the further mercy of their inward conflicts and compulsions." The atmosphere of the Manor is permissive; pressures are released and a boy is allowed, often for the first time in his life, to relax and for a period of respite go his own way and do what he wants. Those labouring under excessive demands laid upon them by ambitious parents, or enduring other emotional strains, find this non-demanding restful atmosphere the first stage to their complete recovery of health, spontaneity, and zest for life. Guidance is offered when required, advice given when sought. There is no psychotherapy as such, no elaborate individual treatment. The highly unusual but largely untrained staff are always there to give emotional support, to offer a challenge or interpret behaviour, and to supply the general background of disinterested affection necessary for a boy's natural development. Such a system puts severe strains upon the staff and demands unusual patience and insight. The boys, too, have to be of superior intelligence if they are to be able to understand what is taking place and be able to discuss themselves and their problems objectively. It is not surprising that few boys with intelligence quotients under 115 are accepted into residence.

Mr. Lyward's method of treatment is extremely personal, based more upon intuition and experience than upon scientific analysis. Yet it does not conflict with orthodox psychiatric methods, and it illustrates the way in which therapeutic communities can be set up without highly trained or professionally qualified staff. "Casualness" characterises the Lyward touch—and individual treatment (which he calls "unfairness," by which is implied not treating boys alike for the sake of superficial conformity but dealing with each according to his personal needs). So each boy sets out on a voyage of discovery of himself and of the community in which he lives, under the piloting touch of a man of genius and unusual devotion. For Lyward is something of a genius and it is doubtful if the work could survive his departure.

This book is a valuable companion to the recent Ministry of Education report on maladjusted children,[2] filling in the human material on the bare bones of fact. It is written from the standpoint of a convinced believer and is naturally uncritical and over-enthusiatic. Inevitably it will be compared with David Wills's *The Barns Experiment*, although his school at Ancrum received boys of a much lower intellectual level and generally from a poorer social background. Their methods are rather similar, but Wills does not claim so high a proportion of successes as Michael Burn does for Finchden Manor. Wills's book is by comparison a more balanced and objective piece of writing, and as a contribution to sociology will certainly outlive the newer book. What would have been equally valuable would have been a book written by Lyward himself setting forth the principles underlying his treatment, together with a deeper analysis of his successes and failures. For failures in such remedial work are as significant as the successes in that they reveal the limits of such treatment and identify the types of children unlikely to respond to it. Lyward's so-called "answer" to maladjustment is only one possible answer and only succeeds with some children. Once that is understood, his work can be viewed in its proper perspective, as a sensitive and skilled exploration of the possibilities of the human personality's power for self-healing in a secure and loving human environment.

1. Mr. Lyward's Answer. By MICHAEL BURN. London: Hamish Hamilton. 1956. Pp. 288. 21s.

CIGARETTE SMOKE

IN 1936 Bogen [3] reported that during the burning of the first quarter of a cigarette the temperature of the inhaled smoke was little different from room-temperature; it reached body-temperature only when half the cigarette had been consumed; and it did not exceed body-temperature until the cigarette had burnt down to a length of about 1 cm. More precise data were given by McNally [4] using thermometers placed in the smoke stream. He found that smoke temperatures remained at 27°C for the first 3·5 cm. and rose to 52°C when the cigarette was smoked to within 0·5 cm. of the end. He pointed out that the rapidity of smoking was important, since cigarettes smoked quickly gave a much hotter smoke, particularly when the cigarette was short.

Experiments conducted by Harlow [5] in the research laboratories of the American Tobacco Co. gave figures for the "coal" temperature (temperature at the burning point) of cigarettes and certain types of pipe tobacco. The coal temperature of cigarettes was 774°C during puffing and 746°C during free burning. The smoke temperature 3·5 mm. from the burning end was 103°C, which means a change in temperature of more than 600°C in the 0·01 sec. taken to travel the 3·5 mm. As Greene [6] has pointed out, these results indicate that, in smoking, tobacco is very rapidly heated to high temperatures; and, in fact, the conditions in burning tobacco are those of thermal cracking whereby free radicles are produced and organic substances break down and recombine. Greene asserts that there is overwhelming evidence that organic compounds readily yielding free radicles are carcinogenic. Harlow found that the temperature of cigarette smoke entering the mouth did not exceed body-temperature until the cigarette was smoked to a shorter length than 23 mm., and only 1

2. See *Lancet*, 1955, ii, 1328.
3. Bogen, E. *Calif. Med.* 1936, **45**, 342.
4. McNally, W. D. *Amer. J. Cancer*, 1932, **16**, 1502.
5. Harlow, E. S. *Science*, 1956, **123**, 226.
6. Greene, C. R. *Ibid*, p. 227.

smoker in 1000, he estimated, smokes cigarettes to that length. Though Greene gave figures for the coal temperature of pipe tobacco 200°–300° lower than that of cigarettes, Harlow maintains that the coal temperature of pipe tobacco can be even higher than that of cigarettes because of the pipe-smokers' habit of taking several small puffs in a very short period.

BREATH-HOLDING ATTACKS

PARENTS usually agree that their children are most "difficult" during the toddling and preschool years. Negativism, temper tantrums, sleep disturbances, and sphincter troubles are at a peak, and there is little reassurance in being told that all children have behaviour problems. No doubt the child is also finding his parents difficult too and he will hardly be consoled by the fact that his parents' intolerable and inexplicable attitudes are normal. Breath-holding attacks are one of the most alarming manifestations of inter-personal tensions during this period. Although they are by no means rare they are often correctly diagnosed only after much anxiety and unnecessary investigations. Perhaps it is their rarity outside the home which has made many doctors unfamiliar with them.

Hippocrates[1] was apparently familiar with breath-holding and there have been many excellent clinical descriptions since. One of the best is quoted by Sir Robert Hutchison[2] from a letter written to him by an observant grandmother:

> "The boy seems a thoroughly healthy little fellow, is just two, but he has a kind of choking fit. The doctor has never happened to see him in one (as he does not choke to order), and I do not think understands the cause of them. The symptoms are these: sometimes when he is thwarted he draws in his breath to cry, but no sound comes, and he gradually turns blue about the lips; his throat seems closed. Cold water is dashed on him sometimes for quite a long time. At last he gasps, then goes limp and unconscious; after a short time he revives, has a good cry, and gets better."

The more detached observer, while not attaining her vividness, might have amplified and slightly amended this description. Fear and fury, as well as frustration, precipitate attacks. But the stimulus may not always be psychic; sharp pain, a fall, or any sudden trauma set off attacks. After a few cries the breath is held in expiration; cyanosis ensues and later gives way to pallor and unconsciousness. If the attack is further prolonged before it is relieved by inspiration, a typical epileptic convulsion occurs. This is usually quite brief and is seldom followed by postictal confusion or sleep.

Current ideas about breath-holding attacks have lately been well reviewed by Zellweger[3] and by Hinman and Dickey.[4] The confusion that existed in the past between breath-holding attacks, idiopathic epilepsy, and laryngismus stridulus has been clarified. Zellweger stresses the "neurovegetative instability" of these children and their parents—a presumably constitutional state which is not widely accepted in this country. Hinman and Dickey believe that breath-holding attacks are a primarily emotional disorder symptomatic of profound insecurity in the child. Most of the children are between six months and five years and it is generally agreed that the disorder is self-limiting. A history of pertussis is not uncommon; the paroxysmal cough and laryngospasm of that disease may in some way condition an abnormal respiratory response, as Bridge et al.[5] suggested.

Diagnosis is not difficult from a detailed history. The attacks are always preceded by a typical stimulus; and the sequence of events and brief duration are characteristic. Some confusion with epilepsy is understandable, but the breath-holding infant who has an epileptic fit due to self-induced cerebral anoxæmia[6] is no more likely to suffer from epilepsy than the adult whose fits are induced by electroconvulsive therapy or convulsive drugs. While the doctor must recognise the identity of the fit in severe breath-holding attacks, there is no indication whatsoever for the prescription of anticonvulsants nor should the word "epilepsy" be mentioned to the parents. Electro-encephalography is not helpful except in the rare case in which both epilepsy and breath-holding occur in the same child.

The management of the condition may be difficult. The parents are usually relieved to know that the attacks are not dangerous, nor symptomatic of grave nervous disease. Neither they nor the child are helped by giving in to every demand of the child nor by trying to stop the attacks by slapping the child or pouring cold water on him. Reassurance and a sympathetic regard for the whole emotional background will do most good in preventing attacks. Provided that the child receives security and affection in proper measure the attacks themselves are best treated with apparent unconcern. When security and love are clearly lacking, the whole family needs guidance. As Culpeper[7] wrote, "There is a disease in children from anger or grief, when the Spirits are much stirred and run from the Heart to the Diaphragm forceably, and hinder or stop the breath. Sometimes they have a shrill voice the Spirits suddenly breaking forth, but when the passion ceaseth, this Symptom ceaseth."

PRELUDE TO RESEARCH

Dr. William B. Bean[8] offers salutary advice on how to embark on research. The first necessity is that there should be an idea. He has no use for "the dragnet and grappling hook approach which hopes to bring up from the murky waters whatever body may be floating about, if there is one" but which too often brings forth only a monstrous array of papers without ancestors or descendants. Rather should the aim be to produce, after a piece of thoughtful work, a paper which adds a sound brick to the growing edifice of knowledge.

Ideas cannot be generated at will: they come from wide general information and intense and thoughtful observation, with meditative rumination often at inaccessible levels. They tend, moreover, to be fleeting, and they should therefore be committed at once, briefly but intelligibly, to a notebook, from which, at the first opportunity, they are transferred more elaborately to a commonplace book. Before starting an investigation the worker should demand of himself a clear statement (broad in aspect but narrow in detail) of its purpose. The construction and subsequent study of such a statement may show the idea to be unsound, the method unsatisfactory, or the work not worth doing—conclusions far better reached now than later. All data should ultimately be recorded in a bound recording book; or at any rate the folder, drawer, or cabinet number of the original crude data should be recorded. Bean favours Hale Ham's procedure of making an experimental protocol—a clear, brief, permanent record permitting exact duplication in the future, and containing data sufficient for publication. Biological material, reagents, and apparatus—especially any departure from standard equipment—should be fully described. Actual procedure is the crux of the experiment, the details of which should be set down so precisely that it can be repeated readily by anyone conversant with the subject. "A compulsive neurosis, conditioned by active and critical thought, seems to be the occupational prerequisite of the investigator."

1. Quoted by Still, G. F. The History of Paediatrics. London, 1931.
2. Hutchison, R. Lectures on Diseases of Children. London, 1936; p. 247.
3. Zellweger, von H. *Helv. pædiat. Acta.* suppl. v, 1948, **3**, 35.
4. Hinman, A., Dickey, L. B. *Amer. J. Dis. Child.* 1956, **91**, 23.
5. Bridge, E. M., Livingston, S., Tietze, J. *Pediat.* 1943, **23**, 539.
6. Sharpey-Schafer, E. P., Howard, P., Leathart, G. L., Dornhorst, A. C. *Brit. med. J.* 1951, ii, 382.
7. Culpeper, N. Tractate of the Cure of Infants. 1684. Quoted by Still, G. F. (ref. 1).
8. Bean, W. B. *Circulation Res.* 1955, **3**, 317.

The Casualty Department

II. SHORTCOMINGS AND DIFFICULTIES *

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THE work of the casualty department has been outlined.[1] Some of the difficulties facing its medical and administrative staff can now be considered.

Medical Problems

Lack of Continuity

Where a junior medical officer, a rota of such, or a rota of general practitioners is responsible for the care or disposal of casualty cases, one of the greatest disadvantages is lack of continuity of medical care. An unsupervised appointment lasting six months or a year, or an attendance at the clinic once or twice a week, gives little opportunity for the doctor to acquire skill, to explore new methods, or to assess late results. There have been great improvements in the treatment of many types of casualty case in recent years, and under the present system these changes have little chance of affecting many of the patients.

Shortage of Staff

In a health service already seriously understaffed with junior medical men the relative unattractiveness of an appointment to the casualty department has resulted in a great shortage of casualty officers.

Before the establishment of a nationally controlled health service criticism was restrained by an appreciation that much of the hospital system was provided by voluntary effort. Since this establishment there has been no such restraint, and although the increase of complaint and attack has done a certain amount of good, it has often been unjust and irresponsible. Casualty departments are particularly liable to suffer from complaints. Most of these are about delay in attention to minor cases, and this is often unavoidable in an ill-designed department where, during certain parts of the day, the speed of arrivals far exceeds the speed with which attention can be given. The more serious ones refer to occasions when major injuries or urgent medical conditions have to wait. The usual reason for this is lack of medical cover, sometimes because the establishment does not allow of a doctor being constantly in the department, and sometimes because, although the establishment is adequate, it has been impossible to find doctors to complete it.

Fear of Legal Action

The increase in litigation against the hospital services, and in the amounts awarded in damages, are making all doctors careful about exposing themselves to legal action; and because casualty departments are particularly liable to such actions, appointments to them have become even less popular than before. Those who accept such appointments find that their clinical decisions are increasingly modified by this situation. Consequently many patients are admitted for observation and are investigated unnecessarily.

Some administrative bodies, with this in mind, tend to appoint officers of more seniority, and aim to make consultant surgeons "responsible" for the work of the casualty department. What this "responsibility" entails is at present obscure. If a consultant is to have any practical effect on casualty work it will take a great deal of his time. To make him merely "responsible on paper" may relieve the anxieties of administrative authorities for a time, but it will confer little benefit on the patients, and will do little to reduce the margin of error in the clinical work. Nobody can be "responsible," in the medical sense, when engaged elsewhere.

Clinical Standards

Clinical results can be vastly improved by applying to the minor surgical problems of the casualty department principles which are generally applied in inpatient surgery. Clinical response partly depends on starting treatment as soon after the injury or the onset of the disease as possible. Two days' delay for a septic hand may mean an extra two weeks' incapacity. Holding a weekly consultant clinic does little to combat this.

Economy of Staff and Money

With the establishment of routine consultation and dressing techniques the long queues of repeat attendances which begin the day's work in most casualty departments can be reduced; and if some assembly-line system is adopted, in which all ambulant patients pass successively through records, medical, and nursing stations, each one can be dealt with more quickly. Such a casualty service needs at least one doctor and corresponding nursing and clerical assistance. Bacteriological and radiological services are essential, and so is adequate space designed to allow transit through entrances, waiting and treatment rooms, and exits without congestion.

It is neither an economic proposition nor would it be possible at present to establish such a department in every hospital in the country. For this to be justified a turnover of about 10,000 patients per annum would be needed. 20,000 patients would require at least two doctors, but considerably less than twice the other facilities, and from this point of view a concentration of casualty work might appear to be a simple solution. However, any attempt to merge a number of smaller units into a single large one has inherent disadvantages.

1. Some of their functions, especially those of reception and disposal, cannot be divorced from the other functions of the individual hospitals.

2. Where a local department is absorbed into a centre, patients have to travel further; and because many of them suffer from trivial complaints, they are less likely to go to this extra trouble. It is useless trying to encourage early attention and at the same time making it harder for patients to get it.

Pilot investigations on the economic impact of minor injuries and sepsis indicate that a working man may cost the Exchequer £5–6 a week when he is incapacitated, and that his loss of earnings amounts to £3 more.[2] The global sum cannot at present be estimated, but must be counted in millions. It is possible, by improving medical and nursing cover, to reduce this by a significant amount. From the point of view of national expenditure, therefore, a nation-wide improvement in the casualty services would repay the outlay of a large sum. It would, for instance, pay the Ministry of National Insurance and Pensions, were they to hand over to the Ministry of Health £1 million a year, earmarked for this purpose alone. Their own payments in benefits would come down by more than this. It would pay the big industrial undertakings to finance improvement in the casualty departments of their own areas, and many of them did so generously before the "appointed day." It is another occasion for that popular rhetorical question: "We may not be able to afford it, but can we afford *not* to have it?"

* Second of three articles dealing with some of the difficulties facing casualty departments of non-teaching hospitals, and outlining a scheme for a more comprehensive accident service.

3. Wilkes, R. *Brit. J. industr. Med.* 1954, ii, 269.

Special Articles

BIOLOGICAL EFFECTS OF ATOMIC RADIATION

A REPORT published in Washington last week is the American counterpart of the Medical Research Council's report on Hazards of Nuclear and Allied Radiations, which is the subject of a leading article on p. 999. The report is based on a survey by six committees of the National Academy of Sciences. The recommendations of the genetics committee include the following:

(1) Records should be kept for every individual, showing his total accumulated lifetime exposure to radiation.
(2) The medical use of X rays should be reduced as much as is consistent with medical necessity.
(3) The average exposure of the population's reproductive cells to radiation above the natural background should be limited to 10 roentgens from conception to age 30.
(4) The 10-roentgen limit should be reconsidered periodically with a view to keeping the reproductive cell exposure at the lowest practicable level.
(5) Individual persons should not receive a total accumulated dose to the reproductive cells of more than 50 roentgens up to age 30 years, and not more than 50 roentgens additional up to age 40.
(6) Techniques for monitoring world-wide fall-out should be further improved.
(7) Measurements of the storage of radiation in the stratosphere should be continued and extended.
(8) A national agency should control and keep records of all dumping of radioactive material in the ocean.

Speaking of contamination by strontium 90 from fall-out after atomic explosions, the report says that already detectable but biologically insignificant traces of strontium 90 have been found in milk-supplies thousands of miles from the site of atomic explosions. At present contamination of food is negligible. "But the maximum tolerable level is not known. There is not nearly enough information about the long-term biological effects on man or animals from eating radiation-contaminated food. Research in this area is urgently needed." The fall-out dose is at present small compared with background radiation and with the average exposure to medical X rays in the United States.

CENTRAL HEALTH SERVICES COUNCIL

THE Minister of Health has appointed or reappointed the following doctors to the council and standing advisory committees for the period ending March 31, 1959:

Central Health Services Council
Janet Aitken, *H. J. B. Atkins, Prof. Robert Cruickshank, * E. J. Rees, * A. Talbot Rogers.

Standing Advisory Committees
Medical.—Janet Aitken, * H. J. B. Atkins, Professor Cruickshank, * S. Whately Davidson, * E. J. Rees, * A. Talbot Rogers.
Dental.—Sir William Kelsey Fry, * A. M. Horsnell (until March 31, 1957).
Pharmaceutical.—Prof. Andrew Wilson.
Ophthalmic.—Janet Aitken, * J. W. Tudor Thomas, Oscar Williams.
Nursing.—Janet Aitken, * G. C. Kelly.
Maternity and Midwifery.—* Sir Arthur Gemmell, Jean M. Mackintosh, * E. J. Rees, * A. Talbot Rogers, J. Forest Smith.
Mental Health.—Desmond Curran, J. R. Rees, C. A. H. Watts.
Tuberculosis.—James Grant, N. R. Barrett, * F. A. H. Simmonds.
Cancer and Radiotherapy.—Janet Aitken, J. R. K. Paterson, * E. J. Rees, * Prof. R. W. Scarff.

* New appointment.

Symposia

VENEREAL DISEASES AND TREPONEMATOSES

THE First International Symposium on Venerea Diseases and Treponematoses, sponsored jointly by the World Health Organisation and the Public Health Service of the U.S. Department of Health, Education, and Welfare, was held in Washington, D.C., from May 28 to June 1.

Syphilis

Incidence

It was repeatedly emphasised that, although modern methods of syphilis control, based on contact tracing and penicillin therapy, can effectively bring down the incidence of early syphilis, some permanent organisation is required to keep it down. In the U.S.A. the incidence of early syphilis has declined progressively from 75·6 per 100,000 in 1947 to a provisional figure of 4·1 per 100,000 in 1955. In consequence there has been a considerable relaxation of effort, and case-finding has been less intensive. About a year ago the numbers of new cases of primary and secondary syphilis rose in several major American cities. Today the significance of this warning is more apparent, and the numbers of cases of early syphilis are increasing in many of the smaller cities with populations of 20,000–200,000. In 1955, of 127 such cities concerning which figures are available, a rise over 1954 occurred in no less than 47. This despite diminished case-finding, so the situation is probably even worse than the figures suggest.

Serum Tests

With the declining incidence of syphilis some have queried whether the cost of routine serum tests (premarital, prenatal, on hospital patients, &c.) is justified by the yield. There is no doubt that it is justified, for only by such means can the reservoir of undetected syphilis be disclosed. In December, 1954, there was an estimated number of 1,921,000 syphilitics requiring treatment in the U.S.A. Today of all cardiac conditions in adults the only one which is really preventable is cardiovascular syphilis. A serum test will reveal latent syphilis before cardiovascular changes have developed, and treatment with penicillin will prevent these from arising.

Experience in Russia

From the papers of the three Russian speakers—Prof. Boris Mikhailowich Pashkov, Prof. Pyotr Vasilievich Kozhevnikov, and Prof. Nikolai Sergeivich Smelov—it was evident that in Russia congenital syphilis is not uncommon, and that endemic syphilis exists in some areas. There is not yet faith in penicillin as the sole curative agent; and, as was the practice in many European countries until a few years ago, arsphenamine and bismuth preparations are still used in addition.

Treatment

Of the purely scientific papers one by A. Hurtig (Ottawa), describing the successful combined use of cortisone and antibiotics in a large series of resistant pelvic infections, made a considerable impression. In the U.S. Navy larger doses of penicillin have become necessary through the years in the treatment of gonorrhœa in the Far East. Of the newer antibiotics 'PA 105' has been successfully used in the treatment of granuloma inguinale, and spiramycin in the treatment of gonorrhœa and non-gonococcal urethritis.

Future Action

That the venereal diseases and the treponematoses remain major public-health hazards throughout the world, that they are not a hazard of any single nation

and cannot be controlled on a world-wide basis by any nation independently, and that, so long as they exist in any nation, they constitute a menace to all nations, was the collective view of the American Venereal Disease Association, which met during the symposium. The association's resolution, which was read to the meeting, urges the maintenance and close integration of a coöperative, international, long-range control programme against the venereal diseases and the treponematoses.

An executive committee, of which Dr. F. W. Reynolds (U.S.A.) is chairman and Dr. R. R. Willcox secretary, is to handle arrangements for the International treponematoses award.

Medicine and the Law

Incurable Insanity as a Ground for Divorce

Two husbands sued for divorce on the ground that their respective wives had been of incurably unsound mind and continuously under care and treatment for a period of at least 5 years immediately preceding the presentation of their petitions. Since 1940 medical evidence has been given at the hearing of insanity petitions by affidavit by the medical superintendent of the hospital where a person alleged to be of unsound mind has been under treatment during the relevant period, and such affidavit, according to a direction of the President of the Probate, Divorce and Admiralty Division,[1] has to state, inter alia, that the patient has been continuously under his care and treatment during the 5-year period and to give his opinion that the patient is of incurably unsound mind. In the present cases the treatment of each of the wives had been delegated to consultants on the hospital staffs (under the Ministry of Health ruling of 1950) and the medical superintendents felt themselves unable to swear to all the matters required by the direction of 1940. Additional affidavits dealing with treatment and the incurable nature of the insanity had been sworn in both cases by all the consultants concerned with the treatment of the wives during the 5-year period.

The President, Lord MERRIMAN, said that, owing to delegation to consultants of responsibility for the clinical treatment of patients (as distinct from the general care which remained vested in the medical superintendent), the medical superintendent was sometimes unable to give first-hand evidence about the diagnosis of the patient's mental illness and the nature of the treatment. Accordingly, in addition to the usual matters, the medical superintendent should state that he had delegated responsibility to a consultant, giving the full name of the consultant and the date of delegation. In such cases an affidavit would be required from the consultant giving the diagnosis, the nature of the treatment prescribed, any special treatment, and the effect thereof; also, if it were the fact, that in the opinion of the consultant and in the light of the medical knowledge of the day, the patient was of incurably unsound mind and the reasons for that opinion, and whether the patient was able to appreciate extra comforts and if so to what amount. If the period of delegation to the last consultant was, on the face of it, insufficient to enable him to depose with certainty, the deponent would be the consultant who had treated the patient for an earlier period of sufficient duration, but, in that case, the evidence would have to be brought up to the date of the presentation of the petition either by the present consultant or the medical superintendent; and the date of the assumption of responsibility by each and any consultant and its duration ought to be specifically stated.

1. *Times*, Nov. 29, 1940.

His Lordship then granted decrees to each of the two petitioners.

Usher *v.* Usher and Abley *v.* Abley — *Probate, Divorce and Admiralty Division:* June 11, 1956. C. Lawson (Jacques & Co.), R. Ormrod (Official Solicitor); R. L. Bayne-Powell (The Law Society), H. T. Walker (Official Solicitor).

ELAINE JONES
Barrister-at-Law.

Parliament

Danger of Children Riding on Farm Tractors

ON the second reading in the House of Lords on June 14 of the Agriculture (Safety, Health and Welfare Provisions) Bill, Earl ST. ALDWYN, joint parliamentary secretary to the Ministry of Agriculture, said that every year between five and ten children were killed by falling off tractors. There was a real danger here which must be prevented if possible. The Bill was read a second time.

QUESTION TIME

Fortified White Flour

Last Monday Mr. D. H. AMORY, the Minister of Agriculture, was asked by several members why in face of the evidence of the Medical Research Council and the British Medical Association in favour of National flour he had accepted the Cohen Panel's recommendation in favour of fortified low-extraction flour. In his replies he said: It was because of the conflict of scientific opinion regarding the nutritive value of flour of varying extraction-rates that the Government in May of last year invited the President of the Royal Society to nominate a panel of independent persons of accepted authority representative of scientific and medical opinion. The whole object of what the Government did was to enable the Government to remain perfectly neutral in this matter as between two strongly expressed medical points of view. I should like it to be absolutely clear that we are not proposing to prohibit anybody from eating bread made with flour of any particular extraction-rate at all. The only prohibition we are imposing is on the use of flour which does not contain a certain minimum quantity of these three token nutrients.

Mr. F. T. WILLEY: Whilst recognising the right hon. gentleman's endeavours to resolve this conflict, may I ask him whether he will not admit that he has failed? Has he seen the opinions recently expressed in medical journals, and is he aware that it appears that the weight of medical evidence is against him; in view of this, would he at any rate look at the matter again?—Mr. AMORY: I think this may well be one of the controversies which will continue until the end of time. In the meantime, the consumer will in the future be able to choose the kind of loaf he or she wishes to eat. I feel that the Government are not entitled to prevent the consumer from exercising such choice, unless there is incontrovertible evidence that it would be to the detriment of his or her health.

Later he added: As regards wholemeal bread, of course, everybody will be entirely free to buy it—[An hon. member: If they can afford it.]—and I shall be among them.

Dr. EDITH SUMMERSKILL: While the Minister says that he believes people should have freedom of choice, does he not feel that he has a duty to the poorest in the community, who understand nothing about extraction-rates, as we do in this House, and that it is his duty to see that they get, and he helps them to buy, what is best for the nutrition of the family?—Mr. AMORY: Again, that is precisely why the Government decided to ask this panel of distinguished scientists and medical experts to resolve the conflict of evidence.

Expenditure Cuts and the N.H.S.

When Mr. HAROLD MACMILLAN, Chancellor of the Exchequer, said he hoped to make a statement shortly about the way in which the Government intends to save £100 million, Mr. A. W. J. LEWIS asked: Will the Chancellor see that there is no cut in the National Health Service, such as is being rumoured or suggested, particularly in view of the fact that we have had an independent report which stated that the health service should not be cut but that there should be some extension of financial support to it? Is the Chancellor aware that the depreciation in the value of the pound is affecting the health service just as it is affecting everyone? In view of that, should there not be increased financial support for the health service?

1. See *Lancet*, Feb. 11, 1956, p. 280.

Mr. MACMILLAN: Of course I shall take carefully into account all that the hon. gentleman has said.

Medical Aspects of Nuclear Radiation

Replying to a question, the PRIME MINISTER said that the complex matters dealt with by the Medical Research Council Committee on the Medical Aspects of Nuclear Radiation would require careful study by all concerned. The findings about radiation from such sources as the diagnostic use of X rays needed much detailed consideration with the appropriate scientific, medical, and industrial bodies. To the extent that Government departments were concerned, arrangements were being made for the necessary studies to be made as soon as possible.

In reply to Mr. WALTER ELLIOT, who asked whether a popular summary of the results could be issued, the PRIME MINISTER said that this would be difficult. "Of course, this is not a Government publication, in the sense that it is done by a body entirely free from Government control or influence." But if, after study of the report, the House felt a need for further elucidation, "we will then consider what we can do to help."

Public Health

Poliomyelitis Vaccination

THE first phase of the poliomyelitis vaccination programme due to end by June 30 will now be confined to the 200,000 children in Great Britain who were first selected. This is because the safety tests successfully passed by all previous batches cannot be completed on any further batch in time to enable local health authorities to arrange for the inoculation of more children by June 30. In a letter to local health authorities explaining the position, the Ministry of Health has stated that priority will be given to children now registered when vaccination is resumed in the autumn.

Antibiotics in Preservation of Fish

Most of the fish eaten in this country is caught between the Faroe Islands and the Arctic Circle and reaches us at the speed of a steam trawler or even slower. Even those who sell it will admit that its taste is not that of fish eaten within a few hours of leaving the sea. The change is due in some part to the growth of bacteria present on the scales, and the traditional methods of preservation depend on cooling or the action of salt to check bacterial multiplication. These were of course devised without any knowledge of bacteriology, and it may well be that the optimum temperature for the growth of the bacteria which cause spoilage is quite low.

The Torry Research Station at Aberdeen has recently been making trial of a new method of preservation first suggested in Canada. It is found that the addition of 5 p.p.m. chlortetracycline (aureomycin) to the salt in which the fish is packed in the trawler improves considerably the appearance, taste, and smell of the fish on landing. The process may add 7–10 days to the "life" of the fish. Trawlers would make longer voyages and customers be better satisfied. As the law stands, such treatment is illegal; but if the trials are successful there will be strong arguments for adopting this method of preservation. It would be foolish to adopt or condemn it in our present state of ignorance.

Stewing for 30 minutes destroys the chlortetracycline in fish preserved in chlortetracycline-ice, but frying leaves minute traces. There is little information about the effects on man of small and intermittent doses of antibiotics. Some animals thrive better and fatten quicker when given a small daily dose of chlortetracycline, but their lives are brutish and short, and long-term effects on them are of no concern. It has, however, been suggested recently that pathogenic strains of *Escherichia coli* are liable to appear in herds where the calves receive a diet supplemented by chlortetracycline.[1] The Torry Institute is seeking some other antibiotic which will be as effective as a preservative but will be more easily destroyed when its usefulness is over. It is to be hoped that the search is successful, for the method as a whole has much to recommend it.

1. Smith, H. W., Crabb, W. E. *Vet. Rec.* 1956, **68**, 274.

In England Now

A Running Commentary by Peripatetic Correspondents

IN medicine, as in the world at large, there is U and non-U.

A U doctor is self-revealing in any discussion. It is more than being on terms of easy formality with the "right" diseases. Your U man knows that the collagen diseases are acceptable nowadays, and could not be caught mentioning such things as "Adaptation Syndrome" or worse still "Stress." But more than that, it is his speech which sets him apart from his non-U fellows—and Fellows. "Systemic lupus erythematosus" is U. It is non-U to talk of "disseminated lupus," and worse of "D.L.E." It is non-U to say "periarteritis nodosa"; but so very U to talk of "polyarteritis nodosum." In the specialties the schism is more obvious. When one hears a neurologist speaking of the "pupillary reactions to light and accommodation" it is certain that he is non-U. The U phrase is, of course, "light and convergence." Cardiologists tend in the main to be U, but if they talk of "lifting outflow tracts" you may be sure of it. Only the non-U would say "parasternal heave." U rheumatologists speak of "spondylitis ankylopoietica," the non-U ones of "ankylosing spondylitis"; and One-up Men call it "Strümpell-Marie disease."

Candidates for consultant appointments may derive some help from the following list though it is incomplete.

U	Non-U
Endocarditis lenta	Infective endocarditis Subacute bacterial endocarditis
Type-1 nephritis	Acute nephritis
Myelomatosis	Multiple myelomatosis
Addisonian anæmia	Pernicious anæmia; P.A.
Corticotrophin	A.C.T.H.
Gall-stones	Cholelithiasis
Valvotomy	Valvulotomy
Phthisis	Pulmonary tuberculosis; T.B.
Lymphoma	Reticulosis
Physical medicine	Physiotherapy
Dystrophia myotonica	Myotonia dystrophica
Atrium	Auricle
m.eq. per litre	Mg. %
Hypokalæmia	Hypopotassæmia
E.S.R.	B.S.R.
Icterus	Jaundice

* * *

To deceive evil spirits (who have very astute hearing) the sickly son in a Chinese household may not be given a name until he has survived the perils of the first year. The laws of the Colony previously permitted the addition of the name of the child up to seven years after the registration of the birth, but recently this period of grace has been reduced to one year. Full advantage is taken of this privilege by the more conservative Chinese, who have to have time to agree to a name which will be auspicious, will be in harmony with his horoscope, and will not displease his ancestors. In the meantime the little fellow may be referred to as "the dog" or even "the buffalo."

It might have been with the idea of fooling the spirits that the Tong-Kang labourer arranged for his wife to be admitted to the tuberculosis hospital under the name of an obliging lady-friend who also supplied the necessary identity card. But the subterfuge did not succeed. Unfortunately the wife died and the death certificate and burial permit were issued in the name on the identity card. Then the trouble started. The spirit of the dead wife appeared to the Tong-Kang labourer in a dream and pleaded with him to have these mistakes rectified so that her soul could rest in peace.

His first attempt at appeasement was to erect a tombstone with the correct name and a very loving epitaph on it. This palliative had no lasting effect. In no time the husband suffered painful reminders that the records had not been changed. Supernatural dogs scratched his back while he slept. Mysterious bruises and swellings appeared on his body. Worst of all, the obliging lady-friend (who was legally dead and buried but was in fact hale and hearty although minus an identity card) was threatened with tuberculosis if the necessary corrections were not made in the official records before the moon waned. After some confusing Statutory Declarations had sorted the quick from the dead the necessary changes were duly made in the official records.

So far the soul of the dead wife appears to have found peace. The Tong-Kang labourer came to the Health Office yesterday looking a different man. He has put on weight, is sleeping well, and no longer fears he is going mad. And the obliging lady-friend's cough is quite better.

* * *

Correcting an examination paper recently I came on this: "Pyelitis. Recognised by looking at the urine. 1. gross—opalescence. 2. microscop—pus cells de luxe." A week later, at the end of the oral examination, I asked the writer what "de luxe" meant. For a moment he looked puzzled and then said with relief: "Oh, dee lux. Well it means plus plus, sir." "In what language?" "Slang." Nonplussed (pas de luxed), I let him go.

He was a great linguist, that fellow. He described the signs of umbilical sepsis as "calor, dolor, rubor, edema, læsio infunctio" (Omphalological papers please copy). Furthermore, he always wrote et instead of and. "Home helps for the aged have been a terrific boon. The G.P. can keep in touch c the other health workers in the district by inviting them to tea every now et then et exchanging ideas et experiences for the mutual benefit of his panel patients."

I wonder why he emphasised tea as the collation. Surely on a Sunday morning the health visitors, &c., would enjoy sherry et cake c the dr.

* * *

I have just obtained my second child's birth certificate. There is nothing remarkable in that: thousands of British fathers have shared the experience during the past year. All I had to do was to drive into the sleepy afternoon streets of the nearby market town, walk up a flight of stairs, and recite *sotto voce* to the registrar the required particulars. There was no-one in the waiting-room; no-one else in the office save the registrar's clerk. 3*s*. 9*d*. changed hands in a somewhat furtive, uncommercial fashion; I was given a couple of N.H.S. forms; and the birth certificate unostentatiously reached my private address the following morning.

How different was my experience, two years ago, when my firstborn arrived! I met my two witnesses (one Italian, the other American) outside the vast, imposing Register Office in Rome, at 8 A.M. Unless one was there at opening time, there wasn't a hope of completing the formalities before the office closed at 2 P.M. Inside, the milling crowd divided itself roughly into two preliminary queues (easily recognisable by their respective demeanours), one to record births, the other deaths. But this, which took perhaps twenty minutes, was only the beginning. We next proceeded upstairs to sign the registration book, in the presence of one of a team of registrars, working three to a room and maintaining a steady output of one registration every two minutes or so. A weighted handclasp with an attendant speeded our progress at this point; we had not waited more than a quarter of an hour before we were giving the usual particulars to a registrar, who wore the black gown of the Italian civil servant and had the little finger-nail of his right hand carefully tapered to an inch-long point.

The birth was now duly registered, and my witnesses could leave; but I had to go through a fresh sequence of formalities in order to obtain the certificate. I waited in another queue to apply for the certificate, and in yet another in order to pay the fee. The certificate would be ready the following morning, and once more I appeared promptly at 8 A.M., and got the certificate after a relatively short wait. Finally I went to the British consulate and registered the birth a second time. The whole procedure cost about 1*s*. 9*d*. for the Italian certificate, 8*s*. for the British one; but the Italian document is better value for money, being gaily adorned with coloured stamps and impressed with the magic letters S P Q R. I have only to look at it to see once more the mimosa blooming in the Roman gardens on that April day.

Of course it's all a question of national temperament, and I would not presume to say whether the Italian way of doing things is better for being a challenge to one's tenacity, or the English for being so much simpler.

* * *

Overheard in the clinic: "He's come on ever so well since I changed to ostrichmilk no. 2."

Letters to the Editor

USE OF VITAMIN K IN THE NEWBORN

SIR,—The standing committee of the British Pædiatric Association on prematurity, in their letter last week,[1] have done well to emphasise the danger of overdosage of vitamin K. This warning comes most opportunely closely following the account by Dr. Bound and Dr. Telfer (May 19) of the effect of large and small doses of 'Synkavit' on plasma-bilirubin levels in premature infants.

This is yet another example of how easily valuable therapy in moderate dosage can become a menace when given in excess of requirements. Such lessons are only learned by bitter experience. They bring to mind other relatively new diseases, such as retrolental fibroplasia following the over-enthusiastic use of oxygen, and "idiopathic" hypercalcæmia, probably the result of carrying prophylaxis against rickets too far in the current manufacture of infant foods in this country.[2,3]

The Hospital for Sick Children,
Great Ormond Street,
London, W.C.1. BERNARD SCHLESINGER.

SIR,—The findings of Dr. Bound and Dr. Telfer prove beyond all doubt that large doses of vitamin K administered to premature babies increase the hyperbilirubinæmia, thus contributing to the development of kernicterus. The mechanism of this action—whether stimulation of hæmolysis or diminished excretion of bile-pigment by the liver—is regarded by the authors as undetermined.

May I call attention to a paper published several years ago [4] in which my associates and I showed that in the active phase of epidemic hepatitis the hyperbilirubinæmia appreciably increases in the eight hours after intravenous injection of the same water-soluble vitamin-K analogue (synkavit)? The dose of 70 mg. we administered to adult patients is rather small, compared with 50 mg. for premature infants; but the rise of plasma-bilirubin level amounted on average to 3·2 mg. per 100 ml. in thirty tests (minimum 1·8 mg., maximum 17·0 mg.). This immediate effect, observed only in icteric hepatitis, was absent in obstructive jaundice and Laennec's cirrhosis. Hæmolysis being out of the question, it was attributed to a temporary reduction, caused by functional overtaxing, of the liver's capacity to handle bilirubin. The same mechanism probably accounts for the more protracted and dangerous action of considerably heavier doses (per lb. body-weight) in premature infants.

István Hospital,
Budapest, Hungary. G. GOTTSEGEN.

BREAD

SIR,—For anyone to show a reasonable interest in the nutritional value (rather than the preservation) of food often suggests beards and sandals as well; further it is probably not difficult to acquire a reputation as a food faddist even when the approach to the subject is quite objective. But the problem of flour extraction-rate, so fully set out in your editorial of June 9, is not a matter of fads or fancies; it is a matter of fact to which the M.R.C. Conference report gives as clear a basis from the scientific aspect as is yet possible to find. Even so no claim is made that the data presented are by any means the last words on the subject; this alone would, one imagines, have caused the panel on flour to have paused before making too definite recommendations.

1. Capon, N. B., Crosse, V. M., Gaisford, W., Lightwood, R., Miller, F. W. *Lancet*, June 16, 1956, p. 966.
2. Morgan, H. G., Mitchell, R. G., Stowers, J. M., Thomson, J. *Ibid*, p. 925.
3. Stapleton, T., Macdonald, W. B., Lightwood, R. *Ibid*, p. 932.
4. Gottsegen, G., Horn, Z., Háry, M. Cs. *Acta med. scand.* 1951, **140** 127.

A pause would have been desirable if only because bread, itself a staple article of diet and likely to be increasingly used as such, is not the only food which is nowadays tampered with, preserved, or even misrepresented, despite legislation to prevent at least some of these happenings. As a profession we are inclined to take short-term views of cause and effect, and a sentence in the M.R.C. Conference report should be drummed into everybody: "the absence of recognisable illness in an individual is not a sufficient criterion that his diet is nutritionally sound."

I have got myself into trouble in the past because of my objections, for quite clear reasons, to the pasteurising of milk as an end in itself; amongst these objections is that we know from experimental work and simple observation that heat-treated milk loses something more than part of its ascorbic-acid content. The usual reply to this is that deficiencies are made up by other articles of food. If one by one the principal articles of food are going to be denatured with official connivance, where shall we finish up? Everybody agrees that all sorts of what are called metabolic or constitutional diseases are on the increase; while it would be stupid to assign their basic pathology necessarily to nutritional causes, at least it makes some of us wonder. There is plenty of evidence from nutrition experiments on laboratory animals that queer things can happen; even clearer is the evidence on a long-term basis from experience in feeding livestock generally, in which changes are more readily observed than in man. But the human animal; for better or for worse, is so resistant to abuses of its economy, whether nutritional or other, that lots of things which must be there to be seen are missed because we do not know what to look for. Since food is the most important of the triad governing life—food, warmth, and shelter—it ill behoves us to monkey about with food too much until we are more sure of our ground.

A recent experience emphasises how much remains to be learnt about nutrition of quite a simple kind. For a number of years I have bred and reared cattle, and in a national show just a fortnight ago I won amongst other prizes one for a sixteen-month-old heifer. This rather surprised me as her nutritional state in the ring was not so good as it had been a few weeks before the show when she was brought in from the herd and given, with a companion, special scientific(?) feeding, as is usual preparatory to such an event. On returning from the show she was turned out with others into an old orchard carpeted with rough old herbage, and within a fortnight she has found for herself a diet which has filled all the hollows that special attention did little to correct. So much for thinking one knows anything about feeding animals. What about human dietary—so easily influenced by Authority.

London, W.1. W. R. THROWER.

TUBAL OCCLUSION

SIR,—Last week Mr. Green-Armytage stated that there is danger in the doctrine that "among patients attending infertility clinics who are found to have blocked tubes, spasm, irritability, anæsthesia, nerves, or even frailty in deductions and methods, are the causes of tubal occlusion in all but 6–7% of cases." After reading this, it is instructive to turn to what Professor Polanyi says in the same issue:

"Science is said to describe *facts* which are there whether you like them or not . . . The function which I attribute here to scientific passion is that of distinguishing between demonstrable facts which are of scientific interest, and those which are not."

For many years now, I have taught and written that a *minimal* criterion for tubal occlusion should be two negative tubal insufflations at 250 mm. Hg, plus a confirmatory hysterosalpingogram, on separate occasions. Even this criterion is not proof-positive of non-patency of the tubes. For too many years a single insufflation finding of non-patency at 200 mm. Hg, or a single hysterosalpingogram which shows apparent non-patency, has been accepted by many gynæcologists as denoting tubal blockage. The importance of tubal spasm, simulating tubal blockage, can be easily demonstrated: every case which shows apparent non-patency at 250 mm. Hg under anæsthesia, should have a repeat-insufflation a few days later without anæsthesia, when normal tubal patency and function is seen in two out of every three such cases. This result has been obtained by me in more than 300 such tests and without the preliminary use of amyl nitrite or any antispasmodic.

I am interested in Mr. Green-Armytage's statement that tuberculosis alone accounts for 5–6% of all occlusions. In a paper presented before the Royal Society of Medicine in 1943, I propounded the view, for the first time, that tubal blockage may, in a considerable proportion of cases, be due to subclinical tuberculous salpingitis.

Royal Samaritan Hospital for Women, Glasgow, S.2. ALBERT SHARMAN.

DIAGNOSIS OF THYROTOXICOSIS

SIR,—I was interested to read last week's letter by Dr. Freeman and Dr. Mattingly on the diagnosis of doubtful cases of thyrotoxicosis.

The differentiation of thyrotoxicosis from an anxiety state is one of the common problems of general practice, and one which often involves referral to hospital with expensive and time-consuming investigations. The measurement of sleeping pulse-rate would be a very simple investigation in general practice if it were possible to use a fairly short-acting hypnotic such as intramuscular paraldehyde; and I would be interested to know whether a true resting pulse-rate is obtainable in this way. If so, admission to hospital for three days, as suggested by your correspondents, would seem unnecessary and extravagant.

London, W.11. J. TUDOR-HART.

A SHORT SMALL INTESTINE ASSOCIATED WITH FIBROSIS OF THE LIVER

SIR,—The article by Dr. Raeburn and Dr. Brafield (June 9) calls attention to the association of a short small intestine with fibrosis of the liver. This association does not seem to be always present, as the following case shows.

A woman, aged 55, had had intermittent vomiting for the past six months. A barium-meal investigation revealed partial obstruction at the duodenojejunal flexure. The proximal 4 inches of the jejunum showed constant narrowing of the lumen with rigidity of the walls and complete loss of the mucosal pattern. The small gut appeared to be short but was otherwise normal. A diagnosis of malignant neoplasm of the jejunum was suggested.

At necropsy (Dr. W. I. Leslie) a congenitally short jejunum and ileum, measuring 8 feet together, was found. The proximal part of the jejunum was bound by firm adhesions to the tail of the pancreas; its lumen appeared to be narrowed and somewhat kinked, but its wall was not infiltrated by growth. There was a scirrhous carcinoma in the distal half of the pancreas. The spleen showed nothing abnormal apart from intense congestion. The liver was firm and was not enlarged; on section, numerous metastatic tumour nodules were found widely distributed throughout the parenchyma.

In this case of congenitally short small intestine no evidence of fibrosis of the liver was present. Possibly the short jejunum, being in closer contact with the tail of the pancreas than is usual, caused chronic irritation by intermittent pressure, thus contributing to the development of cancer in this region.

London, W.1. A. ELKELES.

GIANT HYPERTROPHIC GASTRITIS

SIR,—Giant hypertrophic gastritis is generally considered a benign condition: Dr. Williams (April 7) suggests that an extensive resection through healthy tissue, as for carcinoma, is unnecessary, and Mr. Park (May 19) advocates resection of part of the affected mucosa.

Penetration of the muscularis mucosæ by epithelial elements was not mentioned by Menetrier [1] or by Spriggs [2] but has been described as occurring in giant hypertrophic gastritis by a number of subsequent writers including Dr. Williams. Grime and Whitehead's [3] case is cited as evidence that giant hypertrophic gastritis is a benign condition, since their patient was well 13 months after incomplete removal of the affected stomach; but this stomach showed no submucosal penetration. Maimon et al.[4] describe submucosal penetration in three of their six cases, stating that "it does not suggest neoplasm; it is equivalent to the type of herniation commonly seen in the secondarily contracted gall bladder producing the gland spaces which are called crypts of Rokitansky."

On the other hand Brunn and Pearl [5] say that the only certain sign of malignancy is the invasion by the epithelium through the muscularis mucosæ; describing cases of the allied and often associated condition of multiple gastric polyposis, they found evidence of carcinoma in 12% and, in a later paper,[6] in 19 out of 37 cases.

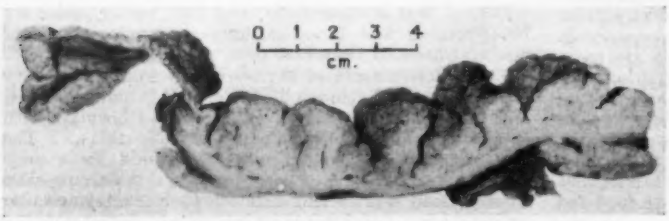


Fig. 1—Stomach wall. Compare hypertrophied portion with normal on left.

Histologists are accustomed to regard invasion of the submucosal stroma by epithelial elements as a major criterion of malignancy in the large intestine. The following case raises the question of whether it should not be so regarded in the stomach:

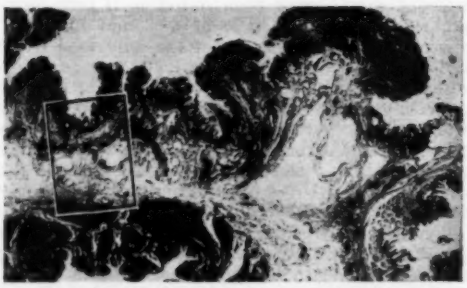


Fig. 2—Section of hypertrophied stomach wall (× 5).

A man of 57 years came to hospital with epigastric and left subcostal pain, of 4 months' duration, unrelated to meals, posture, or exercise but relieved by milk. Each night he had severe pain lasting 15 minutes, and all day he had an ache. He had nausea but had not vomited, and he had been constipated for 7 weeks. Hæmoglobin 113%. Histamine test-meal: free acid, mucus, but no blood. Barium meal suggestive of gastric carcinoma.

At laparotomy, by Mr. G. O. Jelly, the stomach wall was found to be greatly thickened, and was recognised as an example of giant hypertrophic gastritis; but at the cœliac axis there was what appeared to be a carcinomatous lymph-node. No other site of primary carcinoma could be found, so a total gastrectomy was performed.

The mucosa, over an area 16 × 13 cm. in the fundus, was much hypertrophied and thrown into rugæ 1·5 cm. across and 2·5 cm. high, resembling cerebral convolutions (fig. 1). The mucosa was everywhere freely mobile over the muscle. No polypi were present. There was no evidence of past or present ulceration.

On histological examination the affected mucosa is greatly thickened but maintains the normal architecture and cytology (fig. 2). Dilated, irregularly shaped acini, lined by regular well-differentiated mucus-secreting columnar epithelium, are present in the lower levels of the mucosa and penetrate extensively through the muscularis mucosæ into the submucosal layer (fig. 3). Everywhere the epithelium remains regular and cytologically benign (fig. 4). There is a chronic inflammatory infiltrate by plasma-cells, lymphocytes, and some eosinophils in the lamina propria and submucosal layer.

1. Menetrier, P. *Arch. Physiol. norm. path.* 1888, **1**, 32, 236.
2. Spriggs, E. I. *Quart. J. med.* 1943, **12**, 1.
3. Grime, R. T., Whitehead, R. *Brit. J. Surg.* 1951, **39**, 244.
4. Maimon, S. N., Bartlett, J. P., Humphreys, E. M., Palmer, W. L. *Gastroenterology*, 1947, **8**, 397.
5. Brunn, H., Pearl, F. *Surg. Gynec. Obstet.* 1926, **43**, 559.
6. Pearl, F. L., Brunn, H. *Ibid*, 1943, **76**, 257.

Fig. 3—Low power showing extensive invasion of submucosal layer without invasion of muscle wall (× 20).

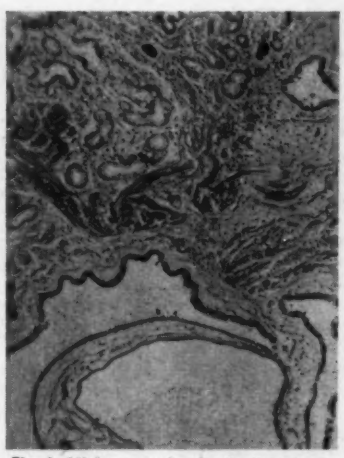


Fig. 4—High power showing benign appearance of invading epithelial elements (× 70).

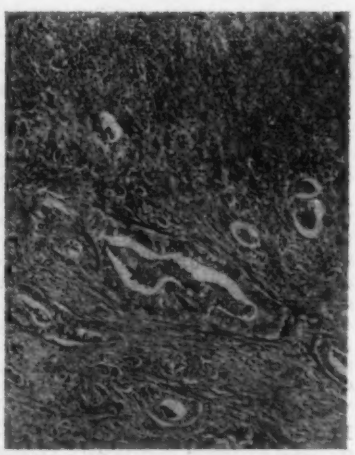


Fig. 5—Lymph-node secondary (× 70).

Three lymph-nodes from the lesser curvature show sinus catarrh but no evidence of malignancy. The cœliac lymph-node and adjacent connective and adipose tissue contain mucus-secreting carcinoma, some of which is similar to, but less well differentiated than, the submucosal elements in the stomach, and some of which is poorly differentiated (fig. 5).

The patient was well when last seen two months after the operation.

I hope to follow this case in order to verify that there is no other primary from which this secondary deposit could have been derived. Meanwhile, in view of the histological similarity between the better-differentiated elements in the lymph-node secondary and the submucosal elements, and the fact that no other primary was noted at the time of operation, it must be assumed that the carcinoma originated in the stomach.

This case suggests that giant hypertrophic gastritis may not always be as benign as it is assumed to be, and that penetration of the submucosa by epithelial elements, however benign in appearance, should be regarded with grave suspicion.

Ancoats Hospital, Manchester, 4. ROGER GILLETT.

ANTENATAL IDENTIFICATION OF HEREDITARY DISORDERS

SIR,—Since amniotic-fluid cells can be obtained from the 12th week of pregnancy [1 2] and the fluid has been shown to contain well-preserved cells from the 12th week and possibly even earlier,[3–5] the most obvious clinical value of using these cells for antenatal diagnosis would be in certain cases of sex-linked abnormalities. Dr. Edwards's comments (April 28) on antenatal detection of hereditary disorders raise the interesting point of using amniotic-fluid cells for other purposes, such as the detection of fœtal antigens.

The actual detection of fœtal antigens can lead directly to early identification of incompatibility during pregnancy, and this may be especially valuable in certain cases where the father is heterozygous. It may also be useful in the field of preventive medicine, in cases of hereditary abnormalities that are genetically linked to an antigen. For this latter purpose it is insufficient to have the type of linkage that has been found with the nail-patella genes,[6] since this is a linkage with the ABO group as a whole. It is necessary to have a close linkage, preferably without any crossing-over, between a hereditary abnormality and a particular antigen—e.g., the antigen for B within the ABO group. The type of linkage to seek is that found between elliptocytosis and a specific Rh combination, where in one family [7] the gene for oval cells always goes with the antigen constitution cDE. In this case there is complete linkage and no crossing-over.

In a list compiled in 1954,[8] of 28 characters that had been examined for linkage with blood-group genes, only 1 shows positive evidence for linkage. But, as Race and Sanger pointed out,[8] this should not discourage further investigation since there are now available many more antigenic markers than could be used in most of the earlier studies. It is therefore desirable that anyone collecting material on human genetics should specifically test for this type of evidence.

It may be predicted that, with an increase in our knowledge of the genetics of man, there will be an increase in the use of amniotic-fluid cells, and possibly even of other constituents of the fluid.

Weizmann Institute of Science, Rehovoth, Israel. LEO SACHS
MATHILDE DANON.

1. Dieckmann, W. J., Davies, M. E. *Amer. J. Obstet. Gynec.* 1933, **25**, 623.
2. Alvarez, H., Caldeyro, R. *Surg. Gynec. Obstet.* 1950, **91**, 1.
3. Serr, D. M., Sachs, L., Danon, M. *Bull. Res. Coun. Israel*, 1955, **5B**, 137.
4. Sachs, L., Serr, D. M., Danon, M. *Science*, 1956, **123**, 548.
5. Sachs, L., Serr, D. M., Danon, M. *Brit. med. J.* (in the press).
6. Renwick, J. H., Lawler, S. D. *Ann. Eugen., Lond.* 1955, **19**, 312.
7. Goodall, H. B., Hendry, D. W. W., Lawler, S. D., Stephen, S. A. *Ibid*, 1953, **17**, 272.
8. Race, R. R., Sanger, R. Blood Groups in Man. Oxford, 1954.

HORMONES AND BREAST CANCER

SIR,—In his provocative letter last week Dr. Loeser states that seaweed was used in Ancient Egypt as a therapeutic agent but wrongly makes the implicit assumption that this was a rational measure.

It is now generally appreciated that Egyptian medicine comprised a curious admixture of largely empirical therapy and a strong element of magic, employing not only oral and written formulæ but amulets and similar talismanic objects. The materia medica of Egypt included rather extraordinary substances and it is not surprising that seaweed should have been included.

It has also been suggested that in Classical Greece burnt seaweed was administered in the treatment of goitre. It cannot seriously be claimed, however, that either in Egypt or in Greece was iodine deliberately used as a rational therapeutic agent, any more than it can be said that Leucippus, Democritus, or Lucretius really anticipated the modern atomic theory based on experimental evidence.

Edible seaweed or dulse has been utilised as a food in Scotland and Ireland, and it would be interesting to know whether there is folk-lore belief in its therapeutic application. A small breed of Orkney sheep is said to subsist largely on seaweed and is claimed to have a high mutton-iodine content. It would be of further interest to know whether this diet has any effect on endocrine relationship in these animals.

Glasgow, S.1. A. T. SANDISON.

SIR,—Dr. Loeser is to be congratulated on his letter. In view of your leading article of May 12, there can be no doubt that there is urgent need for reappraisal of the treatment of advanced cancer. The surgical procedures have become so radical that in many cases the cure, or palliation, must be considered far worse than the disease. Adrenalectomy and hypophysectomy, the latest arrivals in the field, offer magnificant opportunities for the exercise of a high degree of surgical skill, but it would be a brave family doctor who would actually advise a patient to undergo such operations. More and more, attention must turn to the endocrine control of advanced carcinoma, in preference to mutilating surgical procedures, and some attempt must be made to collect the observations and work of independent observers, such as Dr. Loeser, in this field.

All work on the endocrinotherapy of cancer is based on an attempt to modify the hormone environment of the tumour by injection or ingestion of hormones, or by deprivation of hormones by thyroidectomy, oöphorectomy, adrenalectomy, castration, or hypophysectomy. It would appear that the success or otherwise of such methods of endocrinotherapy depends on the effect of the technique employed on the internal balance of the pituitary. There is considerable evidence to show that the cause of cancer is a hypophyseal dysfunction, or hyperfunction of the thyrotrophic centre (the eosinophil cells), with a relative hypofunction of the gonadotrophic centre (the basophil cells). This hypothesis explains the success of Dr. Loeser's treatment by thyroid, just as it explains the success or failure of other hormone treatments.

The administration of small doses of thyroid extract over a long period will diminish the thyroid secretion and the secretion of thyrotrophic hormones, and so enable the pituitary dysfunction to be temporarily corrected. There is a danger, however, that the effect of this administration of thyroid will wear off, and that the original imbalance will be restored, as happens in massive testosterone therapy. We all have experience of the patient with carcinoma of the breast whose secondaries disappear completely with testosterone for two or three years, and then return with speedily fatal results.

As well as attempting to modify the pituitary state by exogenous hormones, attention must be turned to modifying the production of endogenous hormones. This can best be done by the application of short waves to the pituitary and gonads, although it is possible that future methods of treatment will be by radioactive isotopes. A combination of the administration of exogenous hormones and short-wave irradiations on some inoperable cases, in my practice, has

produced remarkable short-term improvement at least equal to that from drastic surgical procedures.

In July, 1938, the late Mr. James Joyce, addressing the Reading Pathological Society, said:

"It is my firm opinion that until cancer can be treated from a new angle such as endocrinology may provide, we cannot hope to obtain the results which will satisfy us in any field of cancer therapy."

Eighteen years later it would appear that we can but re-echo his words, and hope that this branch of endocrinology will be raised to the status its importance merits.

Reading. W. G. TAIT.

INTERMITTENT POSITIVE-PRESSURE RESPIRATION

SIR,—The very interesting case of respiratory paralysis described by Dr. Lawes and Dr. Harries (May 26) will be carefully studied by all who might have charge of such a case. The methods used are known to have been inadequate and so the problem becomes twofold: (1) What treatment was more likely to have succeeded? (2) Is all the necessary equipment at hand to treat a similar case should it be admitted to our own respiratory unit? We would like to comment on some details of the treatment used and to put forward alternative suggestions.

The tracheotomy tube was probably of too small a diameter, and the shape was a major cause of death.

We feel that the tube designed on this unit [1] would have given better results. The metal linings are now made by Thackray, and Magill's tubes in good condition are readily available; so there is no question of special rubber tubes having perished before being wanted. We have not seen any tracheal ulceration develop whilst using these tubes, and have had the added pleasure of seeing an established ulcer heal in a few days when the first of our tubes was put into service.

The following tests probably explain why the infant had increasing carbon-dioxide tension even though the correct ventilation was apparently taking place as shown by measuring the air leaving the expiratory port of the Stott valve.

A Stott valve was connected to a Radcliffe machine which had a gas-meter recording the air intake. The patient was represented by a spirometer with variable weights on the bell. Expired air was measured by another spirometer; unidirectional valves and a pressure gauge were also used at times. Results were variable not only when using different valves but also when repeating the same test on the same valve; but the over-all picture was consistent. Our conclusions were that air can pass from the inlet to the outlet without going to the patient. The volume leaving the Stott valve will equal that entering the machine but will be quite different from that which reaches the patient. The following are two average examples: of 600 ml. entering the machine and eventually leaving the valve, only 400 ml. reached the "patient." Similarly of 450 ml. only 300 reached the "patient." The "lost" air is thought to be compressed in the tubing during inspiration and released during expiration. In clinical use we repeatedly found that the apparent tidal volume had to be maintained in the region of 50% above the figure given on the Radford nomogram, and any reduction in this volume was quickly followed by protests from the patient.

When a B.O.C. flutter-valve was submitted to the same test this discrepancy did not occur. We have found that the B.O.C. valve, being made of softer rubber, produces a 2·5 cm. water-pressure between the machine and the valve and less than 0·5 cm. water-pressure in the airway, whilst the Stott valve produces 6–8 cm. pressure between the machine and the valve and a sustained pressure of 1·5–2 cm. water-pressure in the airway. This may interfere with the gaseous exchange in the lungs. It was found, however, almost at the cost of a life, that the diaphragm of the B.O.C. valve can be inserted reversed and this should be appreciated by all who use them.

Because the percentage of dead space rises as the tidal volume falls a slower rate of ventilation with increased tidal volume should have helped to reduce the carbon-dioxide tension in the infant. Had this not resulted, the temporary use of an efficient absorber could have been tried. Whilst a circle absorber is likely to have been effective, Sandiford's [2] to-and-fro one is almost without dead space and so should be better. With a circle absorber in use, minute volumes can be read on a gas-meter.

We are in full agreement that the inflationary pattern of the Radcliffe is too prolonged. By redesigning the escapement mechanism we can now vary the wave pattern at will.

To summarise, we suggest that the infant was receiving a deficient volume of air through too narrow a tube; and from the many tests which we have done on the Stott valve during recent months we consider the performance to be very variable and that it is not reasonably possible to measure the tidal volume being delivered. One is left to control the patient largely on clinical observations.

There is still room for considerable improvement in our knowledge of techniques and machinery. Is all possible being done to pool existing experience and knowledge which is being gained on a few isolated units which are treating in all comparatively few patients each year?

H. B. C. SANDIFORD
Portsmouth Poliomyelitis Unit. I. MCDONALD.

1. Hodges, R. J. H., Morley, R., O'Driscoll, W. B., McDonald, I. *Lancet*, Jan. 7, 1956, p. 26.
2. Sandiford, H. B. C. *Anæsthesia*, 1953, **8**, 122.

A CALCIUM-INFUSION TEST

SIR,—Dr. Nordin and Dr. Fraser, in your issue of June 2, record an experiment in which 98 patients, including "21 patients in whom there was no reason to suspect metabolic bone disease" and "30 patients with miscellaneous conditions in which bone disease might be suspected" were subjected to a four-hour intravenous infusion.

Would it not be a good principle to state clearly in all accounts of experiments utilising human controls that the human controls are volunteers and to record the means by which their coöperation was achieved?

London, N.W.5. ANTHONY RYLE.

***Dr. Ryle's letter has been shown to Dr. Russell Fraser whose reply follows.—ED. L.

SIR,—Both the preliminary and other subsequent tests of the intravenous procedure described were performed on volunteers amongst the research team. With all patients, agreement to the performance of the test procedure was of course obtained. Those not initially suspected of bone disease willingly gave their consent. We had every reason to believe, from personal experience, that the test was devoid of any risk, and in fact no untoward symptoms or effects followed the test in any instance.

Postgraduate Medical School, London, W.12. RUSSELL FRASER.

ANTENATAL CARE

SIR,—"A concerted effort against toxæmia of pregnancy" need not involve "the chairmen of boards of governors, and of hospital management committees," as implied by the Ministry memorandum to which you referred last week.

It must involve the careful study of the prevention of Eclampsia and Pre-Eclampsia [3] wherein R. H. J. Hamlin sets out the "seven steps" by means of which he eradicated eclampsia at the Women's Hospital, Crown Street, Sydney, together with acceptance of his two points: (*a*) early detection by weight increase between 20th and 30th weeks; and (*b*) institution of a high-protein, high-vitamin, and low-carbohydrate diet at that stage.

The Ministry's memorandum pays lip service to Hamlin ("in Australia the practice of the Women's Hospital, Crown Street, Sydney, described by Hamlin"), but further on states: "a routine designed to detect the smallest deviation from the normal, for example, a rising blood pressure . . . slight œdema or unduly rapid weight

3. *Lancet*, 1952, i, 64.

gain." One realises, as no mention is made of what action he took when the "smallest deviation from the normal" was detected, that his vital point—dietetic control—has been missed. In 1952 Hamlin outlined the progressive stages to eclampsia:

Weight gain of over 8 lb. during the 20th to 30th weeks.

Digital œdema appearing at the 31st to 32nd week.

"The slight, almost imperceptible, rise of diastolic pressure" between the 34th and 37th weeks.

"A slight rise in systolic pressure about the 37th week."

"A swift sudden deterioration through albuminuria (or even without albuminuria) to severe pre-eclampsia or eclampsia."

It would appear, Sir, that the Ministry has heard of Hamlin but has not read him, or they would know that a set of weighing-scales and an appropriate diet sheet in mandatory terms would abolish eclampsia, as Hamlin has.

Since Feb. 6, 1952, I have followed Hamlin's methods in 110 cases, a very small series, and have had 1 case of albuminuria. This patient had persistent albuminuria after I had performed a surgical induction at the 36th week, but was subsequently proved to have a tuberculous abscess discharging via a fistula into the bladder.

Hildenborough, Kent. C. GLAISHER.

ANÆSTHESIA IN OBSTETRICS

SIR,—Anæsthesia for the application of forceps, in addition to the danger of inhaled vomit, diminishes the mother's expulsive forces and also impairs fœtal vitality. Why, therefore, should these disadvantages be courted when analgesia is sufficient?

Devonport, Plymouth. O. LL. LANDER.

DEADLY SWEETS

SIR,—In your annotation of June 9, referring to a further case of ferrous-sulphate poisoning, there is an unfortunate contradiction in advice. In one place you state: "The problem of accidental poisoning will not be solved by reproaching the manufacturer." But further on one reads:

"The replacement of all attractively coloured and flavoured drugs of potential danger by something less deceptively decorated is long overdue, and is the most effective single step we can take towards preventing these tragedies."

There is hope that this further case of iron poisoning may stimulate the manufacturers to issue these tablets in 'Cellophane' envelope strips, but your statement that the manufacturers should not be reproached may reduce the likelihood of their coöperation. Surely this further tragedy should force us all to redouble our efforts with the manufacturers, as well as to increase the knowledge of the general public on the subject.

Plymouth. HUGH JOLLY.

SIR,—In your annotation you say: "The replacement of all attractively coloured and flavoured drugs of potential danger by something less deceptively decorated is long overdue. . . ." Influenced by similar earlier comments in your own and contemporary journals, and by a resolution of the Pharmaceutical Society, my company issued and made widely known to the profession a white and virtually tasteless form of tab. ferr. sulph. co. *N.F.* I understand we were not alone in such action. The continuing demand, however, is for the coloured sugar-coated tablets: the white ones are not wanted. I cannot feel that so many thousands of prescribers are without sound reasons for their preference.

Evans Medical Supplies Ltd.
Speke, Liverpool C. W. ROBINSON
Director.

RUPTURE OF THE SPLEEN

SIR,—Your annotation last week refers to various diagnostic radiological features. In a case recently admitted to this hospital, Howell-Jolly bodies appeared in the peripheral blood, and before laparotomy I strongly suspected a lesion of the spleen.

A woman, aged 57, was admitted for observation following a car accident, not at that time having any definite evidence of injury. Three days later she collapsed and complained of abdominal pain. Examination of the blood showed numerous large polychromatic red cells, many of which contained Howell-Jolly bodies. At laparotomy the same day a ruptured spleen weighing 500 g., together with blood-clot, was removed, there having been a hæmoperitoneum. There were subcapsular and intrasplenic hæmorrhages. Histological examination failed to reveal any evidence of glandular fever or of any other lesion likely to lead to rupture.

Howell-Jolly bodies are known to appear after splenectomy and in certain diseases, but I had not previously been aware that their appearance might precede splenectomy in cases of injury. In the present case a possible explanation is that a form of "auto-splenectomy" took place owing to pressure of the various hæmatomata on the splenic vein, and interference with venous return from the spleen.

I suggest that examination of the blood for Howell-Jolly bodies may be useful in cases of injury in which abdominal and particularly splenic lesions are suspected, but in which laparotomy is not immediately desirable.

Llanelly Hospital, Glamorganshire. A. L. WELLS.

PARAPLEGIA FOLLOWING SPINAL ANÆSTHESIA

SIR,—It becomes almost embarrassing when a university professor of anæsthetics persists determinedly in appearing completely simple in this problem of the unexplained perils inherent in spinal anæsthesia, and ignores the issue raised by the two propositions: (1) that the only known common factor in cases of neurological complications ensuing upon spinal anæsthesia is the intrathecal introduction of an anæsthetic substance, and (2) that the immersion of ampoules of such substances before use in toxic solutions is not such a common factor.

It may be taken for granted that in an important university department such as Sir Robert Macintosh's at Oxford there is an adequate bibliography of the very numerous instances of neurological disaster ensuing upon spinal anæsthesia. Nothing less could be expected of a department the head of which has felt himself able to publish a monograph upon this technique for the instruction of his colleagues.

He must have at hand the information needed either to lend some cogency, if this were possible, to his umbrella hypothesis of the cracked ampoule, or, alternatively, to reveal its large irrelevance.

Can we not persuade him of the expediency, if not of initiating some fruitful research upon this question, at least of providing a comprehensive and dispassionate review of all the known facts and hypotheses up to date?

Surely it is not unreasonable to ask of a university department responsible for research, for teaching, and for setting an example of practice in its own field, something more academic and serious than the collection of three out-of-date anecdotes about cracked pots.

London, W.1. F. M. R. WALSHE.

SIR,—In the early days of my "chemical sympathectomy," produced by paravertebral injection of a 10% aqueous solution of phenol, I had one case which is of interest in connection with this subject.

An obese woman was given a paravertebral injection of 10 ml. of 10% aqueous phenol solution at the level of L3

vertebra. Within a few minutes paraplegia developed with sensory loss up to T6 segment. Lumbar puncture was carried out and a clear fluid smelling strongly of phenol was obtained. Chemical tests confirmed the presence of phenol. The paraplegia wore off in three hours, but the patient had weakness of the quadriceps femoris on the side of injection which took three months to disappear.

It would seem that the needle must have entered an intervertebral foramen and pierced the dura, although no cerebrospinal fluid dripped from it and test aspirations were negative. The weakness of the quadriceps is explained by the high concentration of the phenol round the spinal nerve-roots emerging at the site of injection.

This case has been the only one with neurological complications out of several hundred treated personally by such injections, and it certainly emphasises the need for great care when carrying out paravertebral injections of potent fluids. In addition, it indicates that a considerable amount of phenol can be introduced intrathecally without lasting damage to the spinal cord. In the light of this evidence it seems most unlikely that an ampoule of spinal-anæsthetic fluid immersed in 5% phenol solution could absorb, through microscopic cracks, enough phenol to cause a permanent paraplegia when injected intrathecally. As Sir Francis Walshe indicates (June 2), the only common factor in the reported cases of paraplegia after spinal anæsthesia is the use of a spinal anæsthetic; and it seems clear that the risk of such a tragic complication is inherent in the injection, no matter how perfect the technique of its administration.

Manchester. HERBERT HAXTON.

CAUSE OF HYPOGLYCÆMIC SYMPTOMS

SIR,—In your interesting annotation of June 9 you state that it is hard to estimate the significance of our finding that sweating still occurs in response to hypoglycæmia in patients after thoracolumbar sympathectomy. It should be made clear that sweating was only seen in the regions, such as the face and upper limbs, not affected by the sympathectomy. No sweating was seen in the regions denervated by the operation. However, the point at issue is whether sweating still occurs when, owing to adrenal denervation, adrenaline is not liberated. The persistence of sweating in these patients is thus further evidence that adrenaline plays no part in sweating due to hypoglycæmia.

The lack of correlation between adrenaline release and occurrence of sweating is demonstrated in several other observations. You mention the fact that intravenous infusions of adrenaline do not produce sweating. It is also of interest that the sweating which is a conspicuous feature in a patient with a phæochromocytoma may persist for several days after removal of the tumour,[1] and clearly it cannot be due primarily to the excessive liberation of adrenaline.

Edinburgh. E. B. FRENCH.
Sheffield. R. KILPATRICK.

BUTALITHONE SODIUM IN ELECTROCONVULSIVE THERAPY

SIR,—It may be of interest to mention our preliminary experience with butalithone sodium ('Transithal,' 'Ulbreval') as a substitute for thiopentone sodium in anæsthesia for electroconvulsive therapy.

We have found that butalithone sodium, in a dose of 0·25–0·5 g. given intravenously over half a minute, depresses respiration less than does thiopentone, so that usually inflation is unnecessary. The patient speedily returns to a safe state of consciousness, so that a junior nurse may be left in charge; and the interval before full recovery is very considerably shorter, so that less time is wasted in waiting both by patients and staff in a busy outpatient department.

In our experience, extending over several hundred cases, side-effects, such as hiccup and retching, have been no commoner than with thiopentone.

A. F. M. LITTLE
Plymouth. A. ARNAUD REID.

1. Swan, H. J. C. *Brit. med. J.* 1951, i, 440.

APPENDICECTOMY DURING GYNÆCOLOGICAL OPERATIONS

SIR,—British gynæcologists have always been somewhat doubtful about the advisability of routine appendicectomy when performing hysterectomy or other abdominal gynæcological operations. Some British surgeons, however, and many Americans [1] include appendicectomy as a routine. The late Victor Bonney always advised against routine appendicectomy, and obedience to the principles of this great master has caused me regret on only 3 occasions in which acute appendicitis followed within one week of hysterectomy, involving the patient in a further emergency operation. I have seen a similar complication twice after vaginal hysterectomy. In 1 of these patients a gangrenous appendix with peritonitis was removed forty-eight hours after operation, and in another a chronic pelvic abscess involving the right fallopian tube and ovary developed and was operated upon three months after the original procedure.

The great argument against routine appendicectomy has been the danger of disseminating infection from the bowel wound in the cæcum into the recently exposed cellular planes of the retroperitoneal space. It is certainly true that the pelvic peritoneum recently traumatised by the operation of hysterectomy has not the same ability to resist infection as when the pelvis is intact. It is possible, too, that the pelvic peritoneum is already fully occupied in dealing with the contamination from the vagina inherent in total hysterectomy and that the two portals of infection may, in certain instances, prove overwhelming.

Although it is interesting to speculate on these possible sources of infection, I felt that, if exact information could be obtained from a representative number of British gynæcological surgeons, the results might be helpful to those who, like myself, wonder what is the best and safest procedure. A questionnaire was, therefore, addressed to 31 surgeons, and their replies are summarised below:

(1) Do you remove the appendix as a routine when performing hysterectomy?
No 26; *Yes* 5.

(2) Have you seen any complications as a result of this operation, such as peritonitis, intestinal obstruction, &c.?
No 25; *Yes* 6 (burst abdomen 1, peritonitis 7, intestinal obstruction 1, *Escherichia coli* infection of wound 6). (Of the 6 replying "yes," some had seen more than 1 complication—hence the discrepancy in the figures.)

(3) Have you encountered any complications from not removing the appendix?
No 30; *Yes* 1 (a case of appendicectomy after myomectomy followed by fatal peritonitis).
Of these "noes," 7 recalled patients in whom appendicectomy was necessary within a few months of the hysterectomy. There is no evidence to connect the hysterectomy directly with the appendicitis—i.e., it did not occur within one month of the operation, as in my cases.

(4) Can you give me any references to any published work on this subject?
The replies to this question were an almost universal blank, apart from the figures published by the Royal Society of Medicine in 1949 from the Samaritan Hospital, London.

(5) Any other observations?
Of the 26 surgeons who do not routinely remove the appendix, 16 made the observation that they would

1. Taniguchi, T., Kilkenny, G. S. *Amer. J. Obstet. Gynec.* 1950, **60**, 1359.

remove it if, on inspection, they found it to be diseased, to look unhealthy, to be kinked, to be adherent retrocæcally, or to contain fæcoliths. A few commented that appendicectomy undoubtedly increased the risk of postoperative pyrexia and infection and that it was a complicating factor in the convalescence after hysterectomy.

As a result, the following suggestions can be made:

(1) That British gynæcologists, by a majority, do not advise routine appendicectomy when performing hysterectomy.

(2) That this rule should not be followed unreasonably and the appendix, if obviously diseased or unhealthy, or if containing fæcoliths, is probably best removed.

(3) That there is a real danger of local and general peritonitis, and that simultaneous appendicectomy and hysterectomy should be covered by a course of postoperative antibiotics.

I acknowledge the kind coöperation of the members of the Gynæcological Travellers' Club and other colleagues who kindly answered my questionnaire.

St. Bartholomew's Hospital, London, E.C.1. JOHN HOWKINS.

FATS AND DISEASE

SIR,—Dr. Sinclair's letter (April 7) intrigues me.

In 1952 and subsequently we reported studies, begun in 1950, which showed a profound decrease in plasma cholesterol and phospholipids, in patients maintained on diets containing large amounts of unsaturated vegetable fats.[1 2] Among the possible reasons for such an effect were considered: (1) absence of cholesterol, per se; (2) a positive effect of some vegetable sterol; (3) a positive effect of vegetable phospholipid; (4) a positive effect of one or more fatty acids present in the vegetable fat.

Over the intervening years, by a process of exclusion, all except the last have been essentially eliminated. Studies in which fats of vegetable origin, but of very different iodine number, have been alternated in the diet have shown that the decrease in plasma cholesterol and phospholipid levels is directly related to the amount of unsaturated fat present in the diet.[3] A very recent study, in which 100 g. of a synthetic triglyceride, containing approximately 2 g. of linoleic acid, has been administered daily,[4] further implements this conclusion.

Dr. Sinclair's observations regarding abnormal deposition of lipids in the skin under conditions of essential-fatty-acid deficiency are of considerable interest, as are his speculations regarding the very possible rôle of essential fatty acid and/or pyridoxine deficiency in the pathogenesis of degenerative vascular disease. His observations regarding increased requirement for essential fatty acid in male animals may be particularly pertinent in this regard.

The work of Shapiro and Freedman [5] on the relation of essential-fatty-acid and methionine deficiencies to hypercholesteræmia may help to clarify some of the observations of Best et al.[6] and of Stare et al.[7] on the atherogenic effects of deficiency of choline, of methionine, and of cystine.

If one accepts as a working hypothesis the concept that transport of fatty acid is the major function of cholesterol [4] and recalls that the "normal" fatty acid, which is esterified with cholesterol, is an unsaturated acid,[8] it would seem not improbable that relative or absolute unavailability of essential fatty acids may result in "jamming" of cholesterol metabolism, with resultant increase in production and abnormal deposition of cholesterol. If this concept be even partly correct, it is obvious that experimental efforts designed to evaluate the specific metabolic functions of essential fatty acids, per se, are important. Such studies are under way in this laboratory.

Dr. Keys (April 28) is less than enthusiastic regarding the concept of the importance of essential-fatty-acid deficiency in the pathogenesis of atheromatosis. Dr. Keys says: "We have observed this [i.e., differential effects of different fats upon cholesterogenesis] as well as others, including Kinsell in California, Ahrens in New York, and, recently, Bronte-Stewart in South Africa." Dr. Keys until recently felt that fats were fats, and all were equally bad in regard to cholesterogenesis. Since he appears to have accepted the weight of evidence for the profound differences in "cholesterogenic effects" between some animal and vegetable fats, we may expect that before too long he will decide that deficiency of essential fatty acids plays an important rôle in the pathogenesis of degenerative vascular disease.

Institute for Metabolic Research, Highland Alameda County Hospital, Oakland 6, California. LAURANCE W. KINSELL.

SIR,—May I add my humble voice to the recent flurry of interest engendered by Dr. Sinclair's letter on the possible multitudinous rôles of essential fatty acids in disease? Perhaps this series of letters should be entitled "Hard Fats and Hard Arteries"! Although we are living in an age of rapid advances and as rapidly crystallising opinions, the healthy controversy let loose may well mark the initial break-through in one aspect of the problem of atherosclerosis. While I may be accused of speaking upon a subject to which I am a relative newcomer, my attention in the past three years has been devoted to orienting myself through the slough of fats, lipoprotein carriers (alpha and beta), S_f and S⁻negative particles, Cohn fractions, phospholipids, lipid phosphorus, free and esterified fractions of cholesterol and their ratios, neutral fats and triglycerides, choline and methionine effects, and the relative incidences of arterial diseases in countries torn by war and altered by peace. The purpose of this attempt at orientation was to find what approaches might lead to therapy, for our formerly hypertensive patients are no longer dying of their disease but of atherosclerosis and its manifestations.

Out of these contemplations came a regression (because of confusion) to non-ultracentrifugal simples and to Aschoff's statement: "From plasma of low cholesterol content no deposition of lipoids will occur even though the mechanical conditions are favourable."[9] Added to this might be: "It may matter little how cholesterol and its esters are carried in blood; what is important is the blood level and the nature of the ester." Schönheimer's old but careful analyses of aortic plaques showed clearly that esters of cholesterol increased with severity of the lesions [10]; several fatty acids were demonstrated, but the principal ones were saturated or monoethenoid (stearate, palmitate, oleate). The solubilities of cholesterol esters of unsaturated fatty acids are greater than are those of saturated acids with chains of equal lengths.[11]

To my knowledge, Snapper was the first to suggest that deficiency of unsaturated acids might lead to atherosclerosis,[12] by pointing out the low incidence of the

1. Kinsell, L. W., Partridge, J., Boling, L. A., Margen, S., Michaels, G. D. *J. clin. Endocrin.* 1952, **12**, 909.
2. Kinsell, L. W., Michaels, G. D., Partridge, J. W., Boling, L. A., Balch, H. E., Cochrane, G. C. *J. clin. Nutr.* 1953, **1**, 224.
3. Kinsell, L. W., Michaels, G. D. *Fed. Proc.* 1955, **14**, 661. Friskey, R. W., Michaels, G. D., Kinsell, L. W. *Circulation*, 1955, **12**, 492.
4. Kinsell, L. W., Friskey, R. W., Michaels, G. D., Brown, F. R. *J. clin. Nutr.* (in the press).
5. Shapiro, S. L., Freedman, L. *Amer. J. Physiol.* 1955, **181**, 441.
6. Wilgram, G. F., Hartroft, W. S., Best, C. H. *Brit. med. J.* 1954, ii, 1.
7. Mann, G. V., Andrus, S. B., McNally, A., Stare, F. J. *J. exp. Med.* 1953, **98**, 195.
8. Kelsey, F. E., Longenecker, H. E. *J. biol. Chem.* 1941, **139**, 727.
9. Aschoff, L. Lectures on Pathology. New York, 1924; p. 131.
10. Schönheimer, R. *Z. physiol. Chem.* 1926, **160**, 61.
11. Deuel, H. J. jun. The Lipids. New York, 1951; vol. 1.
12. Snapper, I. Chinese Lessons to Western Medicine. New York, 1941.

disease in Northern Chinese, their high dietary intakes of linoleate and particularly linolenate, and the high iodine number of their serum-lipids (mean 156·6, compared with about 110 for allergic individuals and 84 in our laboratories for atherosclerotic persons). He attempted to obtain a lipid chemist from this country for the purpose of measuring the degree of unsaturation in Chinese fat, when his work was interrupted by the Sino-Japanese war. Obviously, more studies on the iodine numbers of plasma-lipids should be made. The fact that four groups of investigators (Ahrens et al.[13] in New York; Beveridge et al.[14] in Kingston, Ontario; Malmros and Wigand[15] in Lund; and Kinsell et al.[16] in San Francisco) and now a fifth (Bronte-Stewart et al.[17] in South Africa) all have conclusively demonstrated marked decreases in total plasma-cholesterol by feeding vegetable fats with high iodine numbers, leads one to the inescapable conclusion that synthesis, transport, or katabolism of this sterol is intimately affected by some constituent found in the oil and not in saturated animal fats. What is this substance?

Most of your respondents, as I did, have implicated linoleic acid. Dr. Sinclair himself suggests linoleic and arachidonic acids. There are discrepant experimental results inconsistent with this idea.

While the data is not complete, examination of the unsaturated-fatty-acid contents of the oils which lower plasma-cholesterol, as listed in Deuel's comprehensive book,[11] usually contain linolenic acid, as well as the less unsaturated linoleate. Thus, soybean oil (3–11%) and corn oil (0·4%) are those most commonly used; the former is more effective in lowering cholesterol. Likewise, linseed (40–53%, the cake being used as a food in Eastern Europe and the U.S.S.R.), millet seed (6–8%), walnut (3·2%), beechnut (2·9%), mustard (2·7%), wheat, and rye are other sources of linolenate. Alcoholic extract of brain lowers plasma-cholesterol[12]; it may contain at least one unsaturated fatty acid of the linolenate or arachidonate type. On the other hand, there is plenty of linoleic acid in one vegetable oil shown to raise plasma-cholesterol: cottonseed oil (45%, equal to corn oil), as demonstrated by Prof. Ancel Keys. All of the cholesterol-raising fats listed by him are deficient in linolenate, although it is true that contents may vary according to the food intake (for animal fat) or the variety of plant, the climate, and the soil, which may account for discrepant results. Some of the oils used by Bronte-Stewart contain linolenate, arachidonate, or longer-chained more highly unsaturated fatty acids, with the possible exception of ground-nut oil. For example, African sunflower-seed oil probably contains linolenate, South American probably does not. Therefore, the common denominator of cholesterol-lowering oils in man may actually be linolenate or a fatty acid of a higher degree of unsaturation, plus linoleate. Linolenate is a precursor of hexaenoate and linoleate of arachidonate.[19]

Bronte-Stewart et al. obtained results with linolenic-deficient oils quite divergent from those obtained by others, especially in the case of olive oil, which usually raises plasma-cholesterol. In fairness to their excellent and careful work, it is doubtful that a normocholesterolæmic Bantu would respond to an acute fat load in a manner identical with a hypercholesterolæmic Englishman or American. For the former obviously has a healthy cholesterol metabolism, while that of the latter is diseased to some degree or another, if we can believe the statistics. It is probable that the normal values of total plasma-cholesterol are 100–160 mg. per 100 ml., higher values in Europeans and Americans representing disorder.

This attractive hypothesis, however, cannot account entirely for the atherosclerosis found so commonly in civilised persons all over the world, but often absent in the "uncivilised." The presence of extensive aortic calcification in some Egyptian mummies in the British Museum attests to its antiquity. In Japan, often cited as a sclerosis-free area, Kimura's careful study of 1007 necropsies showed gross coronary atherosclerosis of some degree in 80–100% of males of 35 years or older, although the incidence in 3600 less carefully studied cases was a little more than half that value in patients 65 and older; high-grade coronary disease, however, was present in less than 10%.[20] Similar incidences were found in Hawaiian orientals, although severe degrees were present in about half.[21] It is doubtful, therefore, whether we can attribute the presence or the absence of the disease to one factor—essential-fatty-acid deficiency—although this factor may be a strong influence in the severity and therefore the mortality-rate through ischæmic and hæmorrhagic complications.

Not to confuse the point further, but merely to indicate other known influences of "civilisation" which may be accessory factors in abnormal cholesterol and fatty-acid metabolism and in providing an intimal lesion in which cholesterol esters may deposit, we should not forget two. As Dr. Sinclair has well pointed out, vitamin B_6 or pyridoxal phosphate may be involved. This ubiquitous coenzyme not only acts as codecarboxylases and cotransaminases but promotes the conversion of linoleate to arachidonate and linolenate to hexaenoate in rats,[22] thereby increasing the unsaturation of partly unsaturated fatty acids. Furthermore, deficient states in monkeys result in subintimal lesions microscopically identical with those of early atherosclerosis[23 24] (providing a locus where lipids are deposited?); and deficient monkeys fed cholesterol exhibit much higher blood-levels than do controls.[25] This heat-labile, light-unstable coenzyme is low in many processed foods, and many dietaries may be marginal during winter seasons.[26] Does a partly deficient man handle linoleate or even oleate less readily than one with adequate amounts of this vitamin?

The second influence is, strange to say, in trace metals. Pyridoxal probably requires a trace metal for coenzyme activity[27]; on two decarboxylases that metal is possibly zinc. Curran has shown that chromium increases hepatic synthesis of cholesterol and fatty acids in rats by 150%, vanadium depressing synthesis markedly[28] and even reducing aortic lipids by a half in cholesterol-fed rabbits.[29] Furthermore, a chelating agent which is not metabolised, ethylenediamine tetra-acetate, reduces plasma-cholesterol markedly and rapidly when given intravenously and often reduces it to "Bantu levels" when given orally.[30] There are variable but often relatively large amounts of "abnormal" trace elements in American human tissues from all cities studied,[31] with fewer in American stillborn infants and traces to none in the tissues of "raw" African natives (I. H. Tipton, personal communication). Renal and hepatic cadmium, a decarboxylase inhibitor, chromium, tin, titanium, nickel, and lead are some of

13. Ahrens, E. H. jun., Tsaltas, T. T., Hirsch, J., Insull, W. jun. *J. clin. Invest.* 1955, **34**, 918.
14. Beveridge, J. M. R., Connell, W. F., Mayer, G. *Circulation*, 1955, **12**, 499.
15. Malmros, H., Wigand, G. *Minn. Med.* 1955, **38**, 864.
16. Kinsell, L. W., Michaels, G. D., Cochrane, G. C., Partridge, J. W., Jahn, J. J., Balch, H. E. *J. Amer. Diabetes Ass.* 1954, **3**, 113.
17. Bronte-Stewart, R., Antonis, A., Eales, L., Brock, J. F. *Lancet*, April 28, 1956, p. 521.
18. Jones, R. J., Reiss, O. K. *Circulation*, 1955, **12**, 496.
19. Steinberg, G., Slaton, W. H. jun., Howton, D. R., Mead, J. F. *J. biol. Chem.* 1956, **220**, 257.
20. Kimura, N. Cited by Larsen, N. P. *American Practit.* 1955, **6**, 1681.
21. Larsen, N. P. *Ibid.*
22. Witten, P. W., Holman, R. T. *Arch. Biochem. Biophys.* 1952, **41**, 266.
23. Rinehart, J. F., Greenberg, L. D. *Arch. Path.* 1951, **51**, 12.
24. Mushett, C. W., Emerson, G. A. *Fed. Proc.* 1956, **15**, 526.
25. Greenberg, L. D., Rinehart, J. F. *Proc. Soc. exp. Biol., N.Y.* 1951, **76**, 580.
26. Schroeder, H. A. *J. chron. Dis.* 1955, **2**, 28.
27. Metzler, D. E., Ikawa, M., Snell, E. E. *J. Amer. chem. Soc.* 1954, **76**, 648.
28. Curran, G. L. *J. biol. Chem.* 1954, **210**, 765.
29. Curran, G. L., Costello, R. L. *J. exp. Med.* 1956, **103**, 49.
30. Perry, H. M. jun., Schroeder, H. A. *J. chron. Dis.* 1955, **2**, 520.
31. Tipton, I. H., Steiner, R. L., Foland, W. D., Mueller, J., Stanley, M. Oak Ridge National Laboratory Report, C. F. 54-12-66, Dec. 10, 1954.

the "abnormal" metals found, of which several are apparently the results of "civilisation," showing marked differences in these three groups. Some of these are antimetabolic. Cadmium is especially high and accumulates with age. Can an abnormal trace metal affect a pyridoxal enzyme system so as to cause a conditioned local deficiency? If so, lipid metabolism might be altered.

Therefore, intermittent or chronic deficiency of essential fatty acids in man, a distinct possibility in many areas of the world where atherosclerosis is endemic and almost universal, may be only one, albeit a large, factor in furthering the development of this most important disease. It is possible that a high intake of saturated fats may produce deficiency when either intake is marginal or metabolic pathways are disturbed by exogenous influences. On the other hand, we must not neglect biochemically related factors, of which trace metals and vitamin B_6 are two examples, for this disease is probably not the result of any one single disorder in all nations and races.

We cannot wait, however, until all of the metabolic pathways of fatty acid, cholesterol, and collagen metabolism are clearly understood before attempting therapy by lowering plasma-cholesterol in man. Tools are now offered which will do this without hazard or excessive inconvenience. During the present interesting interim between the state of knowledge now and the advent of specific therapy, it has been our practice to lower blood-cholesterol in our patients by (*a*) reducing the intake of saturated fat by about 50%, (*b*) providing about 0·5 g. linolenate per day by the use of soybean oil in salad dressing, sauces, and cooking, (*c*) giving the calcium complex of E.D.T.A. in doses of 1·0 g. per day orally, and (*d*) giving an adequate intake of pyridoxine, on purely theoretical grounds (5 to 10 mg. per day). It may be a long step, however, between low plasma-cholesterol levels and demonstration of reversal of the arterial lesions.

Washington University, St. Louis, Missouri. HENRY A. SCHROEDER.

CIRCULATORY FAILURE IN MARYLEBONE?

SIR,—In some lowly invertebrates the blood-vessels are traversed in both directions, though it must be conceded to the purists that this does not happen simultaneously. Up the evolutionary scale arteries and veins are differentiated, the blood traffic, so to say, being one-way only.

Your older readers will recall the happy, albeit primitive, days when the streets of Marylebone were coursed either North and South or East and West, and the traffic was contained. With its rapid increase over the past years evolved a strange and hybrid vascular system of one-way vessels, two-way vessels, and arteriovenous aneurysms. No doubt some traffic-happy authority had hoped thereby to improve the circulation of this increasingly cyanosed area. Instead there has been a further and polycythæmic increase in the number of (if I may be forgiven the term) carpuscles, anisocytotic and even crash-crenated, trying to circulate along the narrowing vessels. For, to complete the pathology, rows and double rows of parked cars line these vessels and are virtually becoming organised into plaques. Spasmodic occlusion occurs frequently, and it can be only a matter of time before mass thrombosis ensues and the circulation fails completely.

Traditionally Harley Street and its environs has long been a medical precinct, and, despite some invasion by office and flat, it remains predominantly medical. But its streets are being used to saturation point as convenient all-day parking places for the cars of business people and shoppers from the adjoining parts of the West End. To the doctor trying to reach his professional rooms, and the patient trying to meet him in consultation, it becomes increasingly difficult and time-consuming to penetrate its congested roads and to find a temporary resting-place for a vehicle.

As the *New Statesman* was once described of Bloomsbury, so *The Lancet* might still be called the parish magazine of the Harley Street area. This, Sir, is my reason for drawing your attention to the above troublesome and disorganising situation.

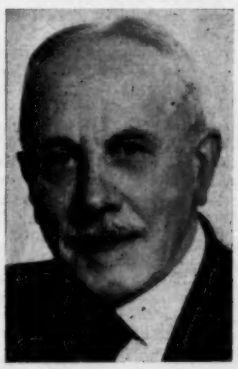
London, W.1. S. CHARLES LEWSEN.

Obituary

WILLIAM HENRY WYNN

M.D. Lond., M.Sc. Birm., F.R.C.P.

Professor Wynn's sixty years of work in the Birmingham medical school began when he entered it in 1895, at 17, having previously won a scholarship at Mason's College from King Edward's Grammar School, Aston. His ability was at once evident: he gained the gold medal in physiology in the London B.SC.; he won prizes both for an essay on altruism and for an investigation of the medullated sheath of nerve-fibres; and he founded the students' representative council. In 1901, the year when he graduated M.B. Lond., his M.SC. (obtained by thesis) was conferred at Birmingham University's first graduation ceremony. He became pathologist to the General Hospital in 1903, and in the following year joined its clinical staff as assistant physician, being only 26.



This was a time when bacteriology was having a strong influence on medical practice, and with his experience in the laboratory Wynn was particularly interested in applications of the work of Almroth Wright and others. As a consultant he was not among those who felt that their task was fulfilled when they had provided a diagnosis; and in his wish to offer effective treatment he especially studied vaccine therapy. Though much of what he attempted has since been outmoded, it reflected his desire not only to attack disease at its source but also to do something for conditions then largely untreatable. His house-physicians and many others will remember the injections of his P.S.I. vaccine which he employed against acute pneumonia—then a formidable disease. Chronic infections, particularly of the respiratory tract, were also treated with vaccines, and often with apparent success. Wynn's acute mind was searching into the problems of infection and immunity. His special interest in diseases of the chest was transmitted to many of those working for him and with him, and introduced them into a branch of medicine which has since burgeoned. In 1910–12 he helped the late Sir John Robertson in setting up the tuberculosis service of Birmingham, and some of the credit belongs to him for the integration of dispensary and sanatorium, of the therapeutic and the preventive aspects of the attack. He was appointed physician to the sanatorium in Yardley and adviser to the Derby County Council.

In 1926 he succeeded J. W. Russell as professor of medicine at Birmingham, and his twenty years' tenure of the chair was parallel with the rise of clinical medicine in its present form, employing more and more ancillary methods. He was active, for example, in the earliest use of X rays in Birmingham. A tribute published last autumn in the university gazette says that Russell, during his few years as professor, had set a new standard in the discharge of academic duty and that Wynn followed his example despite the inevitable sacrifice and inconvenience it entailed.

"His clinical practice at that time covered the whole country and Wynn gave up much of it to concentrate on teaching and administrative work in the Medical School and University; he was one of the small and resolute group who ensured the success of the plan to build a Medical School and a Teaching Hospital in the closest possible association with the University and he shirked none of the drudgery and controversy that the scheme involved in its development."

During his last two years as professor, he was a censor of the Royal College of Physicians, to whose fellowship he had been elected in 1922, and for which he had examined for over ten years. On his retirement he became emeritus professor and director of postgraduate medical studies in the university, an appointment he held for nine further years.

Unassuming and studious, Wynn was sometimes felt to be rather cool and detached; but his patients (as a colleague has written elsewhere) "had the utmost confidence in him; he was considerate and kind and a staunch and enduring friend." Moreover his interests were both wide and enthusiastic. His reading in science and history was catholic, and his FitzPatrick lectures to the College of Physicians, on the Pestilences of War, were the result of much investigation. He was gardener, fruit-farmer, archæologist, and keen traveller.

Before his wife's death in 1935 his house was often open to his students and the hospital residents, and many will gratefully recall dances and tennis parties which enlivened their time at the hospital. Most of his teaching was done at the Birmingham General Hospital, where his rounds and outpatient sessions were performed most regularly and conscientiously.

His life—"from adolescence to obsolescence" as he put it—was filled by professional activities which continued to the end. During his last illness his mind was clear and his interest in science and history unabated. As one of the few surviving original members of the Association of Physicians, he was greatly pleased at getting a letter from the association after its recent fiftieth annual meeting.

Mrs. Wynn, who, like her husband, was a science graduate, was Florence Ashford: they were married in 1907 and had three children. Their son, Mr. Arthur Wynn, is scientific member of the National Coal Board, and there are eight grand-children.

JOHN FRANCIS DIGNAN

B.A., M.B. Dubl., F.R.C.S.I.

Dr. J. F. Dignan, director of the physical-medicine department at the North Middlesex Hospital, London, died at his home in Hertfordshire on June 6.

He was born in London, but received his medical training in Dublin, graduating M.B. with honours from Trinity College in 1942. He determined on a career in surgery, and in 1946 he gained the F.R.C.S.I.; but, while serving as a civilian senior surgical specialist with the Army, he was struck down by the illness which later caused his death. Forced by ill health to abandon surgery, he turned to physical medicine, to which he gave all his energy, becoming especially interested in problems of reablement. In 1952 he was appointed to take charge of the physical-medicine department at the North Middlesex Hospital, and he also worked at Garston Manor Rehabilitation Centre, near Watford. In the winter of 1954–55 he again fell ill, and, as before, he faced this adversity without complaint and with unimpaired good humour. He returned to work, helping others to regain full health but knowing that a term was set to his own days.

Dr. Dignan is survived by his wife.

A. P. H. R.

Births, Marriages, and Deaths

BIRTHS

DAVIES.—On June 7, in Kampala, Uganda, to Daphne (née Perry), wife of Dr. J. N. P. Davies—a son.

MCDONALD.—On June 16, at Queen Charlotte's Hospital, to Greig (née Rattray), wife of Dr. Lawson McDonald—a son.

NEWBORNE.—On June 11, at the Radcliffe Infirmary, Oxford, to Mary, wife of Dr. L. P. A. Newborne—a son.

Diary of the Week

JUNE 24 TO 30

Tuesday, 26th

INSTITUTE OF DERMATOLOGY, Lisle Street, W.C.2
5.30 P.M. Dr. R. T. Brain: Virus Diseases in Children.

Wednesday, 27th

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
5 P.M. *Endocrinology.* Dr. H. D. Purves, Dr. K. R. Thornton, Prof. Dorothy Russell: The Functional Activities of the Basophil Cells of the Pituitary Gland.

POSTGRADUATE MEDICAL SCHOOL OF LONDON, Ducane Road, W.12
2 P.M. Dr. W. A. Gillespie: Staphylococcal Cross-infection.

CHARING CROSS HOSPITAL MEDICAL SCHOOL, Chandos Place, W.C.2
5.30 P.M. Dr. Philip Bradley: The Brain Stem Reticular System: Some Recent Observations on its Physiology and Pharmacology.

INSTITUTE OF DISEASES OF THE CHEST, Brompton, S.W.3
5 P.M. Sir Clement Price Thomas: Benign Lung Tumours.

INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. Arthur Tickner: Vitamins and Skin Metabolism.

BRITISH TUBERCULOSIS ASSOCIATION
2.15 P.M. (Bristol.) Sir A. Havergal Downes-Shaw: Opening address to three-day conference.

Thursday, 28th

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.2
5 P.M. Prof. Komei Nakayama (University of Chiba, Japan): The Localisation of Malignant Tumours of the Intestinal Tract by the Use of Isotopes.

POSTGRADUATE MEDICAL SCHOOL OF LONDON
4 P.M. Dr. E. G. L. Bywaters: Cardiovascular Lesions in Rheumatoid Arthritis and Allied Disorders.

INSTITUTE OF CARDIOLOGY
9.30 A.M. (National Heart Hospital, Westmoreland Street, W.1.) Sir John Parkinson: Aortic Stenosis.

INSTITUTE OF PSYCHIATRY, Maudsley Hospital, Denmark Hill, S.E.5
5 P.M. Prof. Jerzy E. Rose (Baltimore): The Anatomical and Functional Organisation of the Mammalian Thalamus.

INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. Henry Haber: Histology of Some Skin Conditions in Children.

RENAL ASSOCIATION
2.30 P.M. (St. Bartholomew's Hospital Medical College, E.C.1.) Dr. Sidney Locket, Dr. W. A. Floyer, Prof. Clifford Wilson, Dr. Michael Harington: Symposium on Hypertension.

BRITISH ASSOCIATION OF UROLOGICAL SURGEONS
9.30 P.M. (Victoria Building, Liverpool University.) Opening of three-day annual meeting.

Friday, 29th

POSTGRADUATE MEDICAL SCHOOL OF LONDON
10 A.M. Mr. Murray Falconer: The Surgical Treatment of Intracranial Aneurysms and Angiomas.
4 P.M. Sir Daniel Davies: Chlorosis.

INSTITUTE OF CHILD HEALTH
5 P.M. (Hospital for Sick Children, Great Ormond Street, W.C.1.) Prof. G. M. H. Veeneklaas (Leiden, Holland): The Future of the Cœliac Patient.

FACULTY OF RADIOLOGISTS
9.15 A.M. (Cambridge.) Opening of two-day annual meeting.

Appointments

The Hospital for Sick Children, Great Ormond Street, London:

BURGESS, WINIFRED, M.B. Lond., M.R.C.P., D.C.H.: house-physician.
ELLIS, D. A. M., M.B. Lond.: house-surgeon.
MANNION, S. W., M.B. Cape Town: house-surgeon.
NICHOLAS, JUDITH N., M.B., D.A.: junior resident anæsthetist.
PARTRIDGE, J. P., M.B. Lond., F.R.C.S.: resident asst. surgeon.
STANFIELD, J. P., M.D. Lpool, M.R.C.P.: house-physician.
WEIDMAN, M. L., M.D.: house-physician.
WOODRUFF, G. G., M.D.: asst. medical registrar.

Colonial Appointments:

ARNEAUD, J. D., M.B., D.C.P.: pathologist (grade A), Trinidad.
AUDY, J. R., M.B., PH.D. Lond.: specialist (grade B), senior virus research officer (superscale H), Federation of Malaya.
BAIJAL, B. N., M.B. Agra, F.R.C.S.: M.O. (special grade), Western Region, Nigeria.
BYER, M. A., M.B. Edin., M.P.H.: D.M.S., Barbados.
DUCK, E. F., M.B. Lond., D.P.H., D.T.M. & H.: pathologist, General Hospital, Bahamas.
FORBE-WINSLOW, V. F., M.R.C.S., D.P.H.: specialist (hygienist), Eastern Region, Nigeria.
FRENCH, D. C., M.B. Lpool: M.O., Gold Coast.
HOSEIN, C. R., L.R.C.P.E.: M.O. (grade B), Trinidad.
HUTCHINSON, M. P., M.R.C.S., D.T.M. & H.: deputy director, W.A.I.T.R.
KERKHOFF, B. H., M.D. Leiden: M.O., Gold Coast.
MACKAY, C. G. G., M.B. Edin., F.R.C.S.E.: specialist surgeon, Western Region, Nigeria.
MITCHELL, R. M., M.B. Glasg., F.R.F.P.S.: specialist surgeon, Western Region, Nigeria.
NICHOLSON, C. C., M.B. Edin., D.P.H.: health officer, British Guiana.
RAPIER, B. A., M.B. Edin.: medical superintendent, Colony Hospital, Grenada, Windwards.
SMITH, G. G., M.R.C.S., D.T.M. & H.: superintending M.O., Colonial Hospital, San Fernando, Trinidad.

Notes and News

OLD PREJUDICE AND NEW BREAD IN RHODESIA

IF in Britain the millers decide the nature of the bread consumed,[1] in Southern Rhodesia [2] it seems to be the bakers that make the choice. There they have succeeded in going against expert advice and also consumers' wishes. Wheat has to be imported into Rhodesia and the ministry of agriculture wished to see whether it was possible to economise on imports by using surplus maize, sorghum, and millet locally produced. A United Nations expert from Paris visited the country and showed that native buns and white and brown bread could be produced from a flour which was a mixture of 79% wheat, 14% maize, and 7% sorghum. Their cost was much less than that of buns and bread made from wheat flours alone, and in appearance and palatability they were hardly distinguishable from the usual products. A few consumers who had an opportunity to sample them (including prominent members of the African community) one and all expressed their unreserved approval. Their low price would have encouraged consumption.

A meeting of the Salisbury and District Master Baker's Association passed a unanimous vote of disapproval. They objected to handling the substitute flours because, they alleged, this would introduce "rope" (*Bacillus mesentericus*) into their bakeries. In fact, however, "rope" infection never occurred when the new flour was used. This groundless fear was the excuse given for the removal of a whole day's batch of experimental bread intended for consumers' sampling while it was fresh from the oven. The baker who did this afterwards admitted that it was added to certain confectionery manufactured on the premises. An unsolicited criticism of the new bread from another baker was the remark "the fact of having a foreign adviser damaged the scheme from the start." The bakers, so the report says, have successfully prevented the African community from getting the advantages of this palatable, cheaper, and possibly more nutritious new bread.

This conservative attitude of the trade, and their apparent complete disregard for consumers' wishes, is a curious psychological phenomenon. As we remarked in our editorial, the degree of freedom that can be given to the food-producers needs much more thought.

GALACTOSÆMIA

THE pathology section of Manchester Medical Society on May 9 held a symposium on Milk—Babies' Poison?

Dr. A. HOLZEL divided the patients with the clinical syndrome of galactosæmia into three groups according to the severity of the disease. The first group consists of those who are so intolerant of galactose that they succumb within a few weeks or months to liver failure or intercurrent infection supervening on the marasmic state. The second group differs mainly by the ability to survive the period of pure milk feeding; but the stigmata, such as cirrhosis of the liver, cataract, or mental deficiency, may persist throughout life. In the third group are those with reduced galactose tolerance but no clinical signs of the disease; this group comprises relatives of patients with galactosæmia. The abnormal galactose tolerance is inherited as a heterozygous mendelian character, but the genetic mechanism of clinical galactosæmia is not yet fully established. New methods being developed may shed further light on the hereditary aspect. Treatment of the disease requires complete elimination of galactose from the diet to ensure normal development, for even minute quantities can lead to cataract and mental deficiency. Of the diagnostic features amino-aciduria is important, and its disappearance is the most reliable indication of galactose withdrawal from the diet.

Dr. G. M. KOMROWER said that an appreciable amount of galactose is metabolised by the normal or by an alternative pathway. Galactosæmia and galactosuria develop promptly when milk feeding is started, and disappear within thirty-six hours once such feeding is stopped. Proteinuria and amino-aciduria also develop with the addition of milk to the diet; the amounts found are appreciable, and the urine returns slowly to normal when the milk feeding ceases. The amino-aciduria has been shown to be of renal origin, but there is no evidence of glomerular damage. Acidosis of renal-tubular origin also occurs in young galactosæmic babies when on a milk diet; this disappears on a milk-free diet. This triad of proteinuria, amino-aciduria, and renal acidosis indicates a disturbance of the renal tubule, which is quickly corrected when galactose is removed from the diet. Dr. Komrower concluded that the temporary disturbance must be due to some factor other than the galactosæmia.

Mr. V. SCHWARZ, PH.D. and Dr. L. GOLBERG suggested that the congenital abnormality of galactosæmia is not confined to the liver, but is present also in other body-cells. Thus, galactosæmic erythrocytes do not metabolise galactose normally; galactose-1-phosphate accumulates in the cells, indicating that the defective enzyme is not galactokinase. There is evidence that normal carbohydrate metabolism is partly inhibited when galactosæmic cells are exposed to galactose in vivo or in vitro. The galactosæmia syndrome could be explained in terms of partial inhibition of the normal metabolism of liver, kidney, and brain including lenticular cells.

1. See *Lancet*, June 9, 1956, p. 895.
2. Annual Report of the Nutrition Council for Southern Rhodesia for 1955. Mimeographed January, 1956. Salisbury Causeway: P.O. Box 8152.

GENERAL PRACTICE REFORM ASSOCIATION

AT the second annual general meeting on May 26, Dr. Robert John, the president, said that the aim of this association was to promote conditions in which general practitioners would have the opportunity and facilities to exercise the full range of their professional skill. The following resolutions were adopted:

That any award that may be made as the result of the present claim for an increase in the total remuneration of general practitioners should be so distributed as to give the largest increase to small-list practitioners, who are in the greatest need.

That, as an immediate measure, the maximum list for a single-handed practitioner should be reduced to 3000 patients, and the extra list permitted for an assistant to 1500.

That a principal should not normally be permitted to have an extra list for the employment of an assistant for longer than two years.

That the initial practice allowance should be paid in full, free of any conditions as to total professional income, to all doctors starting new practices in designated areas.

That the loaded capitation fee should be paid on the first 1000 patients, instead of from 500 to 1500 as at present.

The meeting was also in favour of a wages council to institute and safeguard terms and conditions of employment for assistants and other practitioners employed privately by principals in the National Health Service.

University of Oxford

At a congregation on June 7 the following degrees were conferred:

D.M.—*A. C. Elithorn, Rodney Finlayson, W. D. Foster, *I. W. de D. Gregory, H. E. Lockhart-Mummery, P. K. Robinson, C. E. D. Taylor.

B.M.—M. H. Heycock, D. L. Miller, Helen J. Pegg.

* By proxy.

University of London

The degree of M.D. has been awarded to T. G. Paxon.

At a recent examination for the academic postgraduate diploma in psychological medicine the following were successful:

Frederic Grunberg, Nehkant Hamermall Rathod.

University of Birmingham

The title of the department of pharmacology and therapeutics has been changed to department of medical biochemistry and pharmacology.

University of Sheffield

Dr. P. E. Brown has been appointed lecturer in public health, and Dr. N. A. Lewtas clinical teacher in radiodiagnosis.

Royal College of Physicians of London

The Bertram Louis Abrahams lecture will be delivered by Dr. I. de Burgh Daly, F.R.S., at the college, Pall Mall East, S.W.1, on Thursday, July 5, at 5 P.M. Dr. Daly will speak on Some Intrinsic Mechanisms of the Lung.

N.H.S. Prescription Forms

The Ministry of Health has asked local executive councils to stamp forms E.C.10 and E.C.10(D) with the name and address of the doctor concerned, before the forms are issued. This, says the Ministry, will help the Joint Pricing Committee in its work of supplying executive councils with statistics showing the average cost of prescribing by individual doctors compared with the average cost for the area.

Royal College of Surgeons of England

At a meeting of the council on June 14, with Sir Harry Platt, the president, in the chair, the Mitchiner medal was presented to Colonel R. E. Waterston and the Lady Cade medal was presented to Air Commodore C. A. Rumball.

The following were coöpted to the council for the year 1956–57 representing various branches of practice:

Dr. O. C. Carter, general practice; Mr. A. C. H. Bell, gynæcology and obstetrics; Mr. Myles L. Formby, otolaryngology; Dr. Frankis T. Evans, anæsthetics; Mr. A. B. Nutt, ophthalmology; and Dr. E. Rohan Williams, radiology.

Prof. F. C. Wilkinson was invited to act as the representative of dental surgery.

The Begley prize was presented to C. R. N. Ashbee (St. Bartholomew's Hospital Medical School).

A diploma of membership was granted to E. O. O. Arbenser.

Diplomas of fellowship were granted to the following:

†H. M. Parsons, P. D. G. Pugh, I. K. R. McMillan, P. N. Porritt, G. N. Lumb, P. I. Busfield, S. S. Grové, P. E. B. Holmes, Ruth M. Robinson, J.-C. Gazet, A. R. Butterfield, Abdel Malak Morkos, E. P. Abson, Ivan Coll, A. W. Eklund, Durgadas Guha, *J. N. Ormrod, Manindra Nath Dutta, Nanubhai Gulabbhai Mehta, W. A. T. Robb, *D. St. Clair Roberts, A. V. Forage, Abul Kasem Bukhtyer Hussain, L. I. McGuire, W. W. Woodward, R. P. Chandler, †G. A. Dalton, Mohamed Altaf Hossain, I. D. Thompson, A. C. Bowring, *R. R. Collmann, K. C. Gordon, †Khuan Loon Lam, †N. C. Little, J. A. MacDougall, G. F. Murnaghan, Satya Parkash, *Jagdish Narayan Rohatgi, J. N. Tennant, M. M. Whiteley, Sailendra Bhattacharyya, K. M. Ewen, L. B. Fleming, Joseph Freidin, *W. J. Levy, D. M. McLaren, T. J. McNair, J. D. Marsh, E. A. D. Russell, R. G. White, J. C. Wilson, R. G. Beard, N. A. Blumberg, K. R. Cox, W. F. Gammie, A. B. Holmes, David Howell, Alimadad Mohlabux Jatoi, J. K. Ross, N. G. Rothnie, Robert Shannon, J. P. Williams, Geoffrey Wynne-Jones, R. P. Yaxley, G. E. Allin, J. B. Borman, M. D. Cameron, Martin Claridge, P. B. Clark, W. T. Costello, C. L. Greaves, J. P. Halliday, G. W. Hankins, William Lane-Mitchell, Hyman Perkin, Phani Bhushan Prasad, Adolf Singer, J. B. Walker, G. A. Cutler, B. J. Dooley, R. F. C. Jones, W. J. Lyons, N. S. Painter, Israel Penn, J. M. Saunders, R. D. Smith, J. D. Crowley, H. T. John.

*In ophthalmology. †In otolaryngology.

Fellows or members of the college who wish to attend the Buckston Browne dinner, to be held in the great hall on Wednesday, July 11, should write immediately to Mr. W. F. Davis, the deputy secretary, enclosing £2 10*s.* to cover the inclusive cost.

Royal College of Physicians of Ireland

At a meeting on June 1, with Dr. F. J. O'Donnell, the president, in the chair, Dr. John G. Kirker was admitted to the fellowship, and the following were admitted to the membership:

R. A. L. Agnew, R. W. Barter, M. D. Joyce, W. H. Moffatt, and W. A. Ryan.

Royal College of Obstetricians and Gynæcologists

The William Meredith Fletcher Shaw lecture will be delivered by Prof. Naguib Mahfouz at 5 P.M. on Tuesday, July 17, at 1, Wimpole Street, London, W.1. Professor Mahfouz is to speak on Urinary Fistulæ in Women. Tickets are obtainable from the secretary of the college, 58, Queen Anne Street, London, W.1.

Medical Research Council

The council has made the following travelling awards for 1956–57:

Rockefeller Travelling Fellowships in Medicine

Dr. J. Anderson, first assistant, Department of Medicine, King's College, Newcastle upon Tyne.

Dr. J. M. Bishop, lecturer in medicine, University of Birmingham.

Dr. J. E. Cotes, member of the council's scientific staff, Pneumoconiosis Research Unit, Cardiff.

Mr. J. E. Pascoe, lecturer, Department of Physiology, University College, London.

Dr. T. P. S. Powell, university demonstrator in anatomy, and lecturer in anatomy, Trinity and St. John's Colleges, Oxford.

Dr. W. G. Spector, lecturer in pathology, University College Hospital Medical School, London.

Eli Lilly Travelling Fellowships in Medicine

Dr. J. B. L. Howell, lecturer in physiological medicine, Middlesex Hospital Medical School, London.

Dr. I. H. Mills, lecturer in medicine and chemical pathology, St. Thomas's Hospital Medical School, London.

Dr. S. D. Morrison, lecturer in physiology, University of Glasgow.

Dr. J. A. Weaver, research fellow, Metabolic Department, Royal Victoria Hospital, Belfast.

Lederle Travelling Fellowship in Medicine

Dr. D. Hobson, senior lecturer in bacteriology, Wright-Fleming Institute, St. Mary's Hospital, London.

French Exchange Scholarships in Medical Science

(In association with the Centre National de la Recherche Scientifique.)

Dr. B. A. Fry, lecturer in microbiology, University of Sheffield.

Dr. F. H. C. Marriott, Nuffield biological scholar, University Laboratory of Physiology, Oxford.

Dorothy Temple Cross Research Fellowship in Tuberculosis

Dr. J. B. Selkon, temporary member of the council's scientific staff, Group for Research on Drug Sensitivity in Tuberculosis, London.

Biochemical Society

On Friday, July 13, at 11 A.M., at the department of biochemistry of the University of Leeds, this society will hold a symposium on metals and enzyme activity.

International Congress on Occupational Health

The 12th International Congress on Occupational Health is to be held in Helsinki on July 1–6, 1957. Inquiries should be addressed to the Organising Committee, c/o Työterveyslaitos, Haartmaninkatu 1, Helsinki-Töölö, Finland.

Midland Centre for Neurosurgery

The Scope of Neurochemistry will be discussed by Dr. G. W. F. Edgar (Amsterdam) at this centre, Smethwick Hospital, Holly Lane, Smethwick, on Thursday, July 5, at 8.15 P.M.

Medical Statistics

The medical section of the Royal Statistical Society is to hold a conference on Medical Statistics at County Hall, London, S.E.1, on Friday, Sept. 28, starting at 10 A.M. Further information may be had from the secretary of the society, 21, Bentinck Street, London, W.1.

British Society for Research on Ageing

At this society's annual meeting in London on June 8 Prof. K. J. Franklin, F.R.S., was elected president, in succession to Sir Charles Dodds, F.R.S. Sir Charles Dodds and Dr. V. Korenchevsky were elected the first honorary members. Information about the society may be obtained from the hon. secretary, Dr. G. H. Bourne, London Hospital Medical College, Turner Street, E.1.

Lady Tata Memorial Fund

For research on leukæmia and allied diseases, in the year beginning next October, the trustees of this fund have made the following awards:

Grants for Research Expenses.—Dr. Jørgen Kieler, Copenhagen; Dr. Jo Nordmann, Paris; Dr. Morten Simensen Copenhagen; Dr. A. Sreenivasan, Bombay; and Prof. Bo Thorell, Stockholm.

Scholarships.—Dr. Jørgen Ringsted, Copenhagen; Dr. Jørgen Rygaard, Copenhagen; Prof. H. G. Teir, Helsinki; Dr. C. G. V. Wasastjerna, Vasa; Dr. Giuseppe Marinone, Pavia; and Dr. A. J. Therkelsen, Aarhus.

Scholarship and Grant.—Dr. M. Seligmann, Paris.

A further grant has been made to the Social Medicine Unit, University of Oxford, for its inquiry into possible environmental factors in the ætiology of human leukæmia.

Westminster Hospital Dinner

At the old students' dinner on June 15, Dr. F. Dudley Hart, speaking as sub-dean, agreed that students aren't what they were: he thought them probably better—perhaps because of better selection. After recalling some of the many athletic and other successes of the year—from the pantomime to the six-asides—he mentioned that joint clinical meetings had been held with students of St. Mary's and might be extended. The clinical supplements of *Broadway* had been so good that requests for them had come (the editor told him) from the Arctic Circle, the Mayo Clinic, and Ducane Road. A faultless speech by Mr. A. Briant Evans in favour of The Guests was answered by the Dean of St. Paul's (Dr. W. R. Matthews), in whom distressing philosophical reflections had been early evoked by his parents' statement that "Dr. Taylor brought you into the world": where had Dr. Taylor got him from, and might he take him back again? Proposing the toast of The Chairman, Prof. R. J. V. Pulvertaft said he was proud to be selected for the purpose from all the many who would have wished to say in public how much they liked F. C. Ormerod and why. When he first saw him, not only did Professor Ormerod look as though he had come back from Afghanistan but he actually *had* come back from Afghanistan; besides which Professor Pulvertaft had various other reasons for admiring him. One of the good things about an institution—whether a regiment or a hospital—was that no man of distinction could ever leave: his influence remained, as Ormerod's remained at Westminster. The Chairman, responding as a grateful prodigal son, spoke of the days when he and Pulvertaft had to decide whether the hospital should be represented by a rugger team or a soccer team, since there were not enough players for both; and he paid tribute to the deans—Woodwark, Abrahams, and Harding—by whom the medical school had been raised to its present position.

CORRIGENDUM: *Phenobarbitone Poisoning treated with Bemegride.*—A reference to footnote 3 was erroneously included in the third sentence of the penultimate paragraph of the letter by Dr. M. S. Perinpanayagam (June 16, 1956, p. 960).

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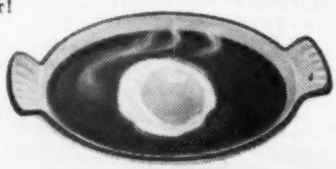

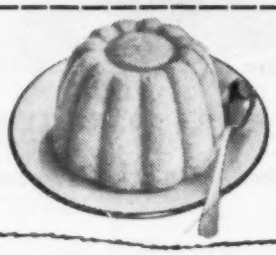

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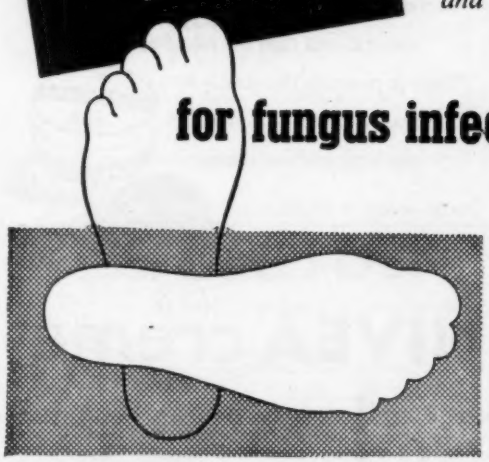

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Academic and Educational

ROYAL COLLEGE OF PHYSICIANS OF LONDON

IVAN DE BURGH DALY, Esq., M.D., F.R.C.P., F.R.S., will deliver the BERTRAM LOUIS ABRAHAMS LECTURE on THURSDAY, 5TH JULY, 1956, at 5 P.M., at the College, Pall Mall East, S.W.1.

Subject: "Some Intrinsic Mechanisms of the Lung."

Any member of the Medical Profession admitted on presentation of card.

By order of the President.
HAROLD BOLDERO, Registrar.

UNIVERSITY COLLEGE LONDON
(Gower-street, W.C.1)

DR. D. A. DENTON (University of Melbourne) will give a Public Lecture entitled "Regulation of Sodium Ion Content in Sheep with Parotid Fistulæ" on TUESDAY, 3RD JULY, at 5.15 P.M.

Admission free, without ticket.

E. A. L. GUETERBOCK, Secretary.

INSTITUTE OF NEUROLOGY (Queen-square)

2 COURSES OF CLINICAL DEMONSTRATIONS, open to Post-graduates, will be held at The National Hospital, Queen-square, on WEDNESDAYS at 4 P.M. from 4TH JULY to 19TH SEPTEMBER, 1956, inclusive, and on SATURDAYS at 10.30 A.M. from 7TH JULY to 22ND SEPTEMBER, 1956, inclusive.

The fee for attending either of these courses is 2 guineas.

Application for a ticket should be made to the Dean, Institute of Neurology (Queen-square), The National Hospital, Queen-square, W.C.1, and a remittance to cover the fee enclosed. Only postal applications will be considered.

ROYAL SOCIETY AND NUFFIELD FOUNDATION COMMONWEALTH BURSARIES

Applications are invited for awards under the Royal Society and Nuffield Foundation Commonwealth Bursaries Scheme which was instituted to provide facilities for increasing the efficiency of scientists of proven worth by enabling them to pursue research, learn techniques or follow other forms of study in natural science in countries other than their own in the Commonwealth where the physical or personal environment or both are peculiarly favourable.

The bursaries provide travel, maintenance at a rate of between about £200 and £600 a year depending on living costs and the applicant's circumstances and are tenable usually for periods of 9–12 months; they are not intended to provide any salary as such. Bursars will not be permitted to prepare specifically for, or to take examinations for, higher degrees or diplomas.

For proposed visits beginning during the period from January to June, 1957, applications must be received complete with supporting documents not later than 15th September, 1956, by the Assistant Secretary, The Royal Society, Burlington House, London, W.1, from whom application forms and fuller particulars may be obtained.

THE ROYAL MEDICAL FOUNDATION OF EPSOM COLLEGE

The ANNUAL GENERAL MEETING of the Governors will be held on WEDNESDAY, 11TH JULY, 1956, at 3.30 P.M., in the Council Room of the Medical Defence Union, on the third floor of Tavistock House South, Entrance "D," Tavistock-square, London, W.C.1.

In addition to ordinary business the Agenda will include the re-election of Governors to the Council, the election of a Vice-President, and amendments to the By-laws to increase from £10 to £100 the value of cheques not requiring counter-signature by members of the Council, and to abolish the special age-limits associated with the Christie Pension and Foundation Scholarships.

A copy of the Agenda in detail will be posted to any Governor on request to me.

By Order of the Council,
A. Y. CANN, Secretary.

The Secretary's Office, Epsom College, Surrey, 8th June, 1956.

SOCIETY OF APOTHECARIES OF LONDON

DIPLOMA IN INDUSTRIAL HEALTH

The next Examination will begin on MONDAY, 2ND JULY, 1956. The following Examination will be held in December, 1956.

For Regulations apply Registrar, Apothecaries' Hall, Black Friars-lane, London, E.C.4.

THE UNIVERSITY OF SHEFFIELD. Department of CHILD HEALTH. Applications are invited for a post of RESEARCH ASSISTANT for the study of the problems of the handicapped child in the house. Appointment for 1 year from 1st October, 1956, on a full-time or part-time (not less than 5 sessions a week) basis. Salary depending on experience, in the range £800–£1300 a year full-time; a part-time appointment at proportionate rate. F.S.S.U. or National Health Service superannuation provision.

Further information may be obtained from the Registrar to whom applications, stating age, qualifications and experience, and names of referees, should be sent by 7th July, 1956.

UNIVERSITY OF EDINBURGH. Department of Public HEALTH AND SOCIAL MEDICINE. Applications are invited for the post of ASSISTANT in the Department of Public Health and Social Medicine from graduates in medicine, biology, psychology, sociology, or any other social science. Among the duties of the successful applicant will be participation in research, and it is intended that he should also do some independent research. Salary scale £550–£50–£650 p.a., with superannuation benefit and family allowance where applicable.

Further particulars may be obtained from the undersigned, with whom applications, giving the names of 2 referees, should be lodged not later than 31st July, 1956.

CHARLES H. STEWART, Secretary to the University.

UNIVERSITY OF GLASGOW. Applications are invited for a LECTURESHIP IN ORTHOPÆDICS. Salary according to placement on University scale for clinical teachers. The final maximum is £1750 p.a. F.S.S.U. and family allowance benefits.

Applications (12 copies) should be lodged, not later than 21st July, 1956, with the undersigned, from whom further particulars may be obtained.

ROBT. T. HUTCHESON, Secretary of University Court.

THE WELSH NATIONAL SCHOOL OF MEDICINE. Applications are invited for the appointment of LECTURER (Full-time) in the Professorial Medical Unit, for a period of 2 years. Salary in the range £700–£100–£1500 p.a. according to qualifications and experience, with participation in superannuation and family allowance schemes.

Further particulars of the appointment may be obtained from the undersigned, by whom applications should be received within 3 weeks of the appearance of this advertisement.

34, Newport-road, Cardiff. F. DODSWORTH, Secretary.

UNIVERSITY OF BELFAST. The Senate of The Queen's University of Belfast invites applications from graduates in medicine for a LECTURESHIP IN CHILD HEALTH from 1st October, 1956, or such later date as may be arranged. Salary £1300–£50–£1950 with provisions for superannuation. In certain circumstances the salary may rise to £2250. Initial placing on the scale will depend on experience and qualifications.

Applications should be submitted by 16th July, 1956. Further particulars from G. R. COWIE, M.A., LL.B., Secretary.

UNIVERSITY COLLEGE OF THE WEST INDIES. Applications are invited for ASSISTANT LECTURESHIP IN PHARMACOLOGY to assist in teaching medical students working for degrees of University of London. Salary scale £850–£100–£1050 p.a. Entry point determined by qualifications and experience. Child allowance, F.S.S.U. Unfurnished accommodation, if available, at rent 5% basic salary, or allowance in lieu. Passages paid for up to 5 persons on appointment, normal termination and study leave (once every 3 years). Duties to be assumed by October, 1956, if possible.

Detailed applications (10 copies), naming 3 referees, by 23rd July, 1956, to Secretary, Senate Committee on Colleges Overseas in special relation, University of London, Senate House, London, W.C.1, from whom further particulars may be obtained.

Hospital Services: Senior Appointments

GUY'S HOSPITAL, S.E.1. The Board of Governors invites applications for the appointment of CONSULTANT RADIOLOGIST, to work in the Dental Department. Attendance will be required on 3 sessions a week. Applicants must hold higher qualifications.

Applications (1 copy), together with the names of 3 referees, should be submitted to reach the Superintendent, Guy's Hospital, London, S.E.1, not later than 30th June, 1956. In accordance with Statutory Instrument No. 1259 of the National Health Service Regulations, canvassing members of the Board or Advisory Appointments Committee will lead to disqualification.

MIDDLESEX HOSPITAL, W.1. Applications invited for the post of ASSISTANT in the Department of Radiotherapy with salary on the scale £1400–£1950.

Further particulars obtainable from the Deputy Superintendent, to whom applications should be sent, naming 2 referees, by 11th July.

NORTH MIDDLESEX HOSPITAL, Edmonton, N.18. Part-time Locum CONSULTANT in Charge Physical Medicine Department required for 23rd July pending permanent appointment. Sessions by arrangement, minimum of 5 per week.

Applications, with all particulars, to Secretary of Hospital.

NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD.

(1) CONSULTANT DERMATOLOGIST (1 half-day a week—Tuesday morning), Mount Vernon Hospital, Northwood, Middlesex (551 Beds).

Applications before 27th July, 1956.

(2) Royal London Homœopathic Hospital, Great Ormond-street, W.C.1 (183 Beds). 2 vacancies (SENIOR HOSPITAL MEDICAL OFFICER) exist on the medical staff of this hospital:—

(i) 2 half-days a week, Tuesday and Friday afternoons.

(ii) 1 half-day a week, Monday mornings.

Candidates, who should be Fellows or Members of the Faculty of Homœopathy, should indicate for which sessions they wish to apply.

Applications before 25th July, 1956.

(3) CONSULTANT PSYCHIATRIST (whole-time) Leavesden Hospital, Abbots Langley, Herts (2378 Beds—mental deficiency), and Abbots Langley Hospital (354 Beds—geriatric long-stay). Successful candidate may be required to act as Deputy Physician-Superintendent.

Applications before 30th July, 1956.

Hospitals may be visited by direct appointment.

(4) OPHTHALMOLOGIST (Senior Hospital Medical Officer grade), St. Pancras School Treatment Centre, 25, Prince of Wales-road, N.W.5. Duties involve 3 visits a week (Monday and Wednesday afternoons and Thursday mornings) each 2½ hours a week clinical time, and candidates may apply for any or all of these sessions. Clinic may be visited by arrangement with the Divisional Medical Officer, 313–319, Harrow-road, W.9.

Applications before 1st August, 1956.

Application forms obtainable from and returnable to Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1.

BARROW AND FURNESS HOSPITAL MANAGEMENT COMMITTEE. Locum Tenens ANÆSTHETIST required for period of at least 6 months, commencing as soon as possible, in the Barrow and Furness Group of hospitals. Remuneration 31½ guineas per week.

Applications to Group Secretary, 10 , Abbey-road, Barrow-in-Furness, immediately.

BRISTOL CLINICAL AREA. South-Western Regional HOSPITAL BOARD. Applications are invited for the appointment of a CONSULTANT ANÆSTHETIST to the Bristol Clinical Area. The appointment will be held on a part-time basis (8 sessions). The successful candidate will work mainly at Frenchay Hospital, Bristol, which is the Regional Centre for Neuro, Plastic, and Thoracic Surgery and has a General Surgical Unit; he will also be required to visit other hospitals in the Clinical Area as determined by the Regional Board from time to time.

Applications (12 copies), stating date of birth, qualifications and experience, together with the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later 7th July, 1956.

CHICHESTER GROUP OF HOSPITALS. Locum Con-SULTANT RADIOLOGIST required, 3 weeks, September, 1956.

Apply Group Secretary, 174, Broyle-road, Chichester.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. ASSISTANT PSYCHIATRIST (whole-time), St. Andrew's Hospital, Thorpe, Norwich (1250 Beds). Hospital provides wide range of modern treatments and outpatient services at general hospitals in the area. Accommodation available. Salary £1500–£1950.

Applications (8 copies), stating age, experience and the names of 3 referees; to Board's Senior Administrative Medical Officer, 117, Chesterton-road, Cambridge, by 9th July, 1956. Candidates invited to visit hospital by direct arrangement with Hospital Management Committee Secretary at the Hospital.

LEEDS. UNITED LEEDS HOSPITALS. The Board of Governors invite applications for the whole-time appointment of CONSULTANT RADIOTHERAPIST. Candidates must be Fellows of the Faculty of Radiologists and have had considerable experience in radiotherapy. Membership of the Royal College of Physicians or Fellowship of the Royal College of Surgeons is desirable but not essential. The successful candidate will be required to assist with the work of the Radiotherapy Centre at Leeds, including peripheral clinics at regional hospitals, and will also be expected to help at other centres in the Region when required. He will be eligible for consideration for the post of Deputy Director of the Leeds Centre.

Applications, giving age, nationality, qualifications, and full details of experience with relevant dates, together with the names of 3 referees, should reach the undersigned by 30th June, 1956.

J. A. TUNSTALL, Secretary to the Board.

General Infirmary, Leeds, 1.

MANCHESTER REGIONAL HOSPITAL BOARD. Whole-time Locum ANÆSTHETIST (Senior Hospital Medical Officer) required for approximately 4 months for the Rochdale Group of hospitals. Resident or non-resident. Salary 31½ guineas per week.

Apply at once to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale.

MANCHESTER REGIONAL HOSPITAL BOARD. Whole-time NON-RESIDENT ASSISTANT RADIOLOGIST (Senior Hospital Medical Officer), mainly at Withington Hospital, Manchester (mainly acute—1000 Beds). Wide experience, higher qualifications essential; appointee to work under general guidance of Consultant.

Application forms from the Senior Administrative Medical Officer to the Board, Cheetwood-road, Manchester, 8, to be returned by 5th July, 1956.

NEWCASTLE REGIONAL HOSPITAL BOARD. New-CASTLE GENERAL HOSPITAL. (838 Beds.) (Population covered 388,000). SENIOR CASUALTY OFFICER (medical) whole-time. Appointee with Senior Surgical Casualty Officer will be required to undertake the work of a very busy Casualty Department subject to the supervision of the Senior General Physicians and will also have duties in connection with the medical examinations of staff. Duration of appointment not exceeding 4 years. Salary scale £1400–£1950 p.a. Appointee will be required to reside in close proximity to the Newcastle General Hospital. Resident accommodation may be available. Further particulars from Senior Administrative Medical Officer.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Walker Gate Hospital, Benfield-road, Newcastle upon Tyne, 6, within 28 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. Special AREA COMMITTEE FOR CUMBERLAND AND NORTH WESTMORLAND. Whole-time SENIOR CASUALTY OFFICER required for West Cumberland Group of hospitals. Main hospitals: Whitehaven Hospital (124 Beds) and Workington Infirmary (118 Beds). To work under general supervision of 1 or more consultant surgeons and 1 or more consultant orthopædic surgeons; based at Whitehaven Hospital with duties in other hospitals. Appointment for a period not exceeding 4 years; commencing salary within the scale £1500–£1950 p.a.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, 72, Warwick-road, Carlisle, within 28 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. Gates-HEAD DISTRICT HOSPITAL MANAGEMENT COMMITTEE AREA. (Main hospitals: Queen Elizabeth (176 Beds), Bensham General (230 Beds), Dunston Hill (300 Beds).) CONSULTANT ANÆSTHETIST, whole-time or maximum part-time for 9 notional half-days per week. (Initially, as a temporary measure, the appointee may be required to devote approximately half of his time to sessions in the Newcastle group of hospitals.)

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Walker Gate Hospital, Benfield-road, Newcastle upon Tyne, 6, within 28 days.

SCOTLAND. SOUTH-EASTERN REGIONAL HOS-PITAL BOARD. Locum Tenens CONSULTANT RADIOLOGIST, whole-time or part-time, for duty in hospitals in Fife during July and August.

Applications, giving qualifications and the names of 2 referees, should be sent to the Secretary, South-Eastern Regional Hospital Board, Scotland, 11, Drumsheugh-gardens, Edinburgh, 3, by 1st July.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the following appointments:—

Whole-time ASSISTANT CARDIOLOGIST based at the Victoria Infirmary, Glasgow, and with associated duties elsewhere. Salary (at age 32 and over) on the scale £1500–£50–£1950.

ASSISTANT ANÆSTHETIST based at the Vale of Leven Hospital, Alexandria. The appointment will be whole-time or on the maximum part-time basis of 9 notional half-days per week. Salary (at age 32 and over) on the scale £1500–£50–£1950.

These appointments are subject to the National Health Service (Scotland) superannuation regulations.

Applications (16 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, C.2, not later than 30 days after the publication of this advertisement.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of CONSULTANT SURGEON at the Western Infirmary, Glasgow. The appointment, which involves teaching duties, will be whole-time or part-time remunerated on the basis of 9 notional half-days per week. This appointment is subject to the National Health Service (Scotland) superannuation regulations.

Applications (16 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, C.2, not later than 30 days after the publication of this advertisement.

SCOTLAND. EASTERN REGIONAL HOSPITAL BOARD. UNIVERSITY OF ST. ANDREWS. CONSULTANT PSYCHIATRIST/PROFESSOR OF PSYCHIATRY. Applications are invited from registered medical practitioners holding a higher qualification in psychiatry for a whole-time Consultant appointment in psychiatry. The successful applicant will be appointed by the Regional Hospital Board as Physician in charge of the Psychiatric Ward (22 Beds) and Outpatient Clinic at Maryfield Hospital, Dundee (a teaching hospital) and Physician-Superintendent of Dundee Royal Mental Hospital (a hospital of 100 Beds for acute mental disorders). He will also be appointed to the Chair of Psychiatry which the University is intending to institute during the academic year 1956/57.

Application forms and copies of a memorandum giving full information about the appointment and of the salary and conditions of service attached to it may be obtained from the Secretary, Eastern Regional Hospital Board, 430, Blackness-road, Dundee, to whom completed application forms are to be returned not later than 21st July, 1956.

SOUTH WEST METROPOLITAN REGIONAL HOS-PITAL BOARD. Whole-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer grade) required at the Cassel Hospital (for functional nervous disorders), Richmond, Surrey. Candidates should possess D.P.M. and must have particular interest and experience in psycho-analysis.

Applications by letter (5 copies), giving date of birth, qualifications, experience and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 14th July, 1956. Applicants may visit hospital by local arrangement.

SOUTH WEST METROPOLITAN REGIONAL HOS-PITAL BOARD. Part-time CONSULTANT OPHTHALMOLOGIST (1 half-day per week) required at Horsham Hospital, Sussex, for weekly outpatient clinic (Mondays A.M.; Thursdays A.M. or P.M. possible alternative). Orthoptist employed. Preference given to candidate with access to ophthalmic surgical beds elsewhere, since no provision for operative work possible at hospital.

Applications by letter (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1.) South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 21st July, 1956. Applicants may visit hospital by local arrangement.

SOUTH WEST METROPOLITAN REGIONAL HOS-PITAL BOARD. Part-time CONSULTANT OBSTETRICIAN AND GYNÆCOLOGIST (9 half-days per week) required for the Woking and Chertsey (Surrey) Group of hospitals. Successful candidate required to live in or near Woking; duties to include share of emergency obstetric work at Woking Maternity Hospital and 2 other maternity units in the Group. Position vacant from 1st January, 1957.

Applications by letter (5 copies) giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 21st July, 1956. Applicants may visit hospitals by local arrangement.

AUSTRALIA. ROCKHAMPTON HOSPITAL, Queens-LAND. Applications in writing are invited for appointment for 3 years to the following Part-time SPECIALIST appointments at the Rockhampton Hospital:—

Physician. 1 session of 3 hours per week divided into an outpatient session of 2 hours and an inpatient session of 1 hour. Salary £340 p.a.

E.N.T. 1 outpatient session of 3 hours per week and 1 inpatient session of 3 hours per week. Salary £680 p.a.

Rockhampton has a population of 42,000 and is the centre of a district of 90,000 in population.

Further particulars regarding position and opportunity for private practice will be forwarded upon request. Appointees to be not over 60 years of age.

Applications should be addressed to the Secretary, Rockhampton Hospitals Board, Rockhampton. Applications close 31st August, 1956.

WESTERN AUSTRALIA. ROYAL PERTH HOSPITAL.
SENIOR STAFF RADIOLOGIST.
2 STAFF RADIOLOGISTS.
Applications are invited for the above full-time posts in Diagnostic Radiology. Candidates must be fully qualified Radiologists and preference will be given to those with higher qualifications.

Salary :—
Senior Staff Radiologist : £A2980 p.a.
Staff Radiologist : Salary within the range of £A2290 p.a.–£A2460 p.a., according to qualifications and experience.

These rates are at present under review and the amended rates will be set out in the Memorandum of Particulars.

The Royal Perth Hospital is a designated Medical Undergraduate Teaching Hospital ; it has more than 600 Beds and is extending.

The Senior Staff Radiologist will work under the over-all direction of the Director of Radiology who will be a senior member of the Honorary Staff. The Senior Staff Radiologist will be responsible for duties of full-time staff ; internal management of the department ; training of technicians ; arrangement of demonstrations and provision of radiological teaching material.

A memorandum of further particulars concerning these posts will be supplied on request.

Applications must include particulars of qualifications, experience, age, marital status, war service, if any, and the names of 2 referees, and should reach the undersigned on or before 31st August, 1956. JOSEPH GRIFFITH, Administrator.

NEW ZEALAND. PALMERSTON NORTH HOSPITAL BOARD, PALMERSTON NORTH. Applications are invited for the position of MEDICAL SUPERINTENDENT. The duties include those of Medical Superintendent of a general hospital of 410 Beds with a visiting part-time staff. Applicants should have a surgical training. Duties are administrative with limited clinical work.

Salary is prescribed by the Hospital Employment (Medical Officers) Regulations, 1952. The successful applicant will be subject to grading procedure under the regulations and the commencing salary will be established within the following scales :—

Scale (*b*) £N.Z.1940–£2190.
Scale (*c*) £N.Z.1690–£1940.

The general wage increase of £N.Z. 81 7s. is payable in addition to the above and a recent Government decision will mean a further increase in the above scales, the amount of which is to be decided shortly.

Conditions and memorandum of appointment are obtainable from the High Commissioner for New Zealand, 415, Strand, London, W.C.2.

Applications, giving full particulars as to age, qualifications and experience and accompanied by recent testimonials, should be addressed to the Secretary, Palmerston North Hospital Board, Palmerston North, New Zealand, and will be received until 12 noon on the 8th August, 1956.

NEW ZEALAND. THE OTAGO HOSPITAL BOARD, DUNEDIN, NEW ZEALAND. Applications are invited from persons who have held a medical degree for at least 5 years, for the position of Full-time ASSISTANT THORACIC SURGEON at the Dunedin Hospital.

The salary scale payable will be in accordance with the appointee's experience and qualifications and will be either :—

(*a*) Junior Specialist's scale : £1290–£1590 plus general wage increase of £81 7s. p.a., or
(*b*) Senior Registrar's scale : £985 13s. – £1100 13s., plus general wage increase of £81 7s. p.a.

The commencing salary within the applicable scale will be that determined by the Medical Officers' Salaries Grading Committee in accordance with the experience, qualifications and status of the appointee. The position is non-resident, is full-time and private practice is not permitted. Travelling expenses in accordance with those stated in the conditions of appointment are payable where the appointee signs an agreement to remain in the service for a period of 2 years. Conditions of appointment and a general outline of conditions in Dunedin, may be obtained on application to THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2, or High Commissioner for New Zealand, 415, Strand, London.

Applications, stating age, experience and qualifications, together with health and radiological certificates, should be in the hands of the undersigned not later than 10 A.M. on Monday, 6th August, 1956.

W. A. WILLIAMSON, Secretary, Otago Hospital Board.
P.O. Box 946, Dunedin, New Zealand.

NEW ZEALAND. THE OTAGO HOSPITAL BOARD, UNIVERSITY OF OTAGO, NEW ZEALAND. Applications are invited for the position of JUNIOR SPECIALIST ANÆSTHETIST (Dunedin Hospital), ASSISTANT LECTURER in Anæsthetics (Otago Medical School), from those who hold a Degree in Medicine of an approved university. The position is full-time and private practice is not permitted. The position is designated as that of Junior Specialist under the Hospital Employment (Medical Officers) Regulations. Salary scale £1290–£1590, plus general wage increase, by annual increments of £50. Commencing salary according to qualifications and experience. Duties will include the practical teaching of anæsthetics to Medical and Dental Students. The position is non-resident. Travelling expenses as set out in the conditions of appointment will be paid when a Contract of Service is signed. Conditions of appointment and application forms may be obtained from the Office of the High Commissioner for New Zealand, 415, Strand, London, or from THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Applications, stating age, qualifications and experience, together with testimonials, health and radiological certificates, will be received by the undersigned until 10 A.M., Monday, 6th August, 1956.

W. A. WILLIAMSON, Secretary, Otago Hospital Board.
P.O. Box 946, Dunedin, New Zealand.

NEW ZEALAND. THE OTAGO HOSPITAL BOARD, DUNEDIN. Applications are invited for the position of DIAGNOSTIC RADIOLOGIST, Otago Hospital Board. Applicants must hold a Degree in Medicine of an approved University and possess a higher qualification in the specialty. The salary payable will be that of a Junior or Senior Specialist under the Hospital Employment Regulations, viz. : £1290–£1940 p.a., plus general wage increase of £81 7s. p.a. The commencing salary will be determined in accordance with the qualifications and experience of the appointee. The position is a full-time and non-resident one. Travelling expenses as set out in the Conditions of Appointment will be paid when a Contract of Service is signed. Conditions of appointment and application forms may be obtained from the Office of the High Commissioner for New Zealand, 415, Strand, London, or from THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Applications, stating age, qualifications and experience together with testimonials, health and radiological certificates, will be received by the undersigned until 10 A.M. on Monday, 20th August, 1956.

W. A. WILLIAMSON, Secretary, Otago Hospital Board.
P.O. Box 946, Dunedin, New Zealand.

NORTHERN IRELAND HOSPITALS AUTHORITY invite applications for a post as CONSULTANT SURGEON at hospitals managed by the West Tyrone Hospital Management Committee. The appointment will be on a part-time basis of 8 half-days per week and the terms and conditions will be in accordance with the application of the Spens Report to Northern Ireland.

Applications to be made on a form obtainable (with further particulars) from the Secretary, Northern Ireland Hospitals Authority, 44–46, Queen-street, Belfast, and to be returned not later than 7th July, 1956.

Hospital Services : Junior Appointments

ANNIE McCALL MATERNITY HOSPITAL, Jeffreys-road, S.W.4. Applications are invited from registered Women medical practitioners for the post of RESIDENT OBSTETRIC HOUSE SURGEON (post recognised for the D.Obst.R.C.O.G.). Appointment is for a period of 6 months, vacant 1st August, 1956.

Applications, stating age, qualifications with dates and nationality, accompanied by copies of 3 recent testimonials, should be sent to the Secretary, Annie McCall Maternity Hospital, not later than 4th July, 1956.

BOW GROUP HOSPITAL MANAGEMENT COMMITTEE. HOUSE PHYSICIAN for general medical wards. Post vacant 8th July, 1956.

Applications, stating age, qualifications, and experience, together with the names and addresses of 2 referees, to be sent to the Hospital Secretary, St. Clement's Hospital, 2A, Bow-road, E.3.

BROMPTON HOSPITAL, S.W.3. Applications invited for post of SENIOR REGISTRAR (whole-time) to the Cardiac Department from those who have completed at least the third year of their general medical training as a Senior Registrar. One who has completed or will shortly be completing the fourth year is preferred. Applicants from the Commonwealth of Senior Registrar status are eligible provided they intend to return abroad on completion of training. Appointment is for 1 year with eligibility for reappointment.

Applications, stating age, qualifications with dates, nationality, and appointments held, together with copies of 3 testimonials, by 10th July, 1956, to KENNETH A. F. MILES, House Governor.

CENTRAL MIDDLESEX HOSPITAL, Park Royal, N.W.10. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR required in Department of Physical Medicine, Central Middlesex Hospital (726 Beds). Whole-time or 9 sessions. Non-resident appointment. Appointment offers broad experience in all branches of this specialty and close contact with general medical problems. Possession of Part I of D.T.M. an advantage. Hospital may be visited by direct appointment.

Application forms from and returnable to Secretary, Central Middlesex Group Hospital Management Committee, Park Royal, N.W.10, by 7th July, 1956.

CENTRAL MIDDLESEX HOSPITAL, Park Royal, N.W.10. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR required in X-ray Department. Whole-time, non-resident appointment for 1 year in first instance, under supervision of consultant, will include teaching and some work in Mass X-ray Department. Possession of diploma desirable. Post vacant August, 1956. Hospital may be visited by direct appointment. Salary £850 p.a. in first year, £965 p.a. in second year, subject to terms and conditions of service of hospital medical and dental staff.

Application forms from and returnable to Secretary, Central Middlesex Group Hospital Management Committee, Park Royal, N.W.10, by 7th July, 1956.

CENTRAL MIDDLESEX HOSPITAL, Park Royal, N.W.10. RESIDENT HOUSE OFFICER (pre-registration) required in General Medical Department, including hæmatology and endocrinology. Post vacant 1st August.

Apply, with 2 testimonials, to Medical Director by 30th June.

CENTRAL MIDDLESEX HOSPITAL, Park Royal, N.W.10. RESIDENT HOUSE OFFICER required in Pædiatric Department. Post-registration appointment recognised for D.C.H. Appointment from 1st August, 1956.

Applications, with 2 testimonials, to Medical Director by 30th June, 1956.

DULWICH HOSPITAL, East Dulwich-grove, London, S.E.22. SENIOR HOUSE OFFICER (casualty duties). Post recognised for F.R.C.S. examination. Vacant from 23rd July, 1956. Salary £745 a year. Non-resident. Day-time duty only.

Applications, stating age, qualifications and experience with copy testimonials, to the Group Secretary, Camberwell Hospital Management Committee, Dulwich Hospital, as soon as possible.

EASTERN HOSPITAL (FEVERS), London, E.9. Applications for the 6-month appointment of registered RESIDENT HOUSE OFFICER (post now vacant) should reach Group Secretary, Hackney Hospital, E.9, by 6th July, quoting EH/HO. Duties may include some work in Chest Unit. Facilities for post-graduate study.

FULHAM HOSPITAL, St. Dunstan's-road, Hammersmith, W.6. FULHAM AND KENSINGTON HOSPITAL MANAGEMENT COMMITTEE. Qualified medical practitioners, including pre-registration candidates, are invited to apply for the following vacancies :—

HOUSE SURGEON (2 vacancies), appointments recognised for F.R.C.S.

HOUSE PHYSICIAN (3 vacancies).

Appointments commence 1st August, 1956, are resident and are limited to 6 months.

Applications by 3rd July, 1956, on forms obtainable from the Hospital Secretary. (L.78.)

FRIERN HOSPITAL, New Southgate, London, N.11. (2470 Beds.) PSYCHIATRIC REGISTRAR required at above Hospital. Candidates should have adequate general medical and psychiatric experience. Details of the appointment and work in the hospital may be obtained on application to the Physician-Superintendent, and applicants are invited to visit the hospital by appointment.

Application forms obtainable from, and returnable to, Secretary, Friern Hospital, within 14 days.

HACKNEY HOSPITAL, London, E.9. (General—841 Beds.) Applications for the 6-month resident appointment from 18th July of Pre-registration HOUSE PHYSICIAN (first post) should reach the Secretary at above address, by 6th July, quoting HH/PHP.

HACKNEY HOSPITAL, London, E.9. (General—841 Beds.) Applications for the 6-month appointment of resident pre-registration HOUSE SURGEON (post vacant 16th July; recognised for F.R.C.S.) should reach the Secretary at above address, by 6th July, quoting HH/PHS.

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL, Ducane-road, London, W.12. HOUSE SURGEON (general surgery) required 1st August.

Applications, stating age, qualifications, experience, copies of 2 recent testimonials, to Secretary, Board of Governors, by 2nd July.

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL, Ducane-road, London, W.12. Whole-time REGISTRAR (orthopædics) required 1st August. Appointment tenable for 3 years, of which 2 will be spent at Hammersmith Hospital and the Postgraduate Medical School of London studying orthopædic and traumatic surgery and 1 year (resident if required) at Heatherwood Hospital, Ascot, studying long-term orthopædic surgery. Joint appointment with North West Metropolitan Regional Hospital Board.

Applications, stating age, qualifications, experience, names of 2 referees, to Secretary, Board of Governors, by 6th July.

HENDON DISTRICT HOSPITAL, 357, Hendon-way, Hendon, N.W.4. Applications are invited from General Medical Practitioners, whose practices are within a radius of 1½ miles of above Hospital for appointment to the medical staff of that Hospital. Members of the Medical Staff have access to the general and private beds for the admission and treatment of their own patients and to such outpatient facilities as at present exist or can be provided by existing staff and accommodation. They are required to undertake on roster duties the treatment of patients admitted under emergency arrangements who are not patients of other members of the staff. Further details may be obtained from the Hon. Medical Superintendent of the Hospital.

Applications should be addressed to the Group Secretary, Hendon Group Hospital Management Committee, Edgware General Hospital, Edgware, not later than 30th June, 1956.

HIGHLANDS GENERAL HOSPITAL, Winchmore Hill, London, N.21. ANÆSTHETIST (House Officer grade), resident. 100 active surgical and orthopædic beds, approximately 1200 operations annually.

Applications, with copies of 3 testimonials, and name and address of 1 referee, to Hospital Secretary.

HIGHLANDS GENERAL HOSPITAL, Winchmore Hill, London, N.21. HOUSE SURGEON required. Duties mainly orthopædic with some E.N.T., casualty and emergency general surgery. New Operating Theatre, Outpatient and Casualty Departments. Preference given for applicants seeking pre-registration post under Medical Act, 1950.

Applications, with copies of 3 testimonials and name and address of 1 referee, to Hospital Secretary.

HOSPITAL OF ST. JOHN AND ST. ELIZABETH, 60, Grove End-road, London, N.W.8. Applications are invited from pre-registration or registered medical practitioners (Male) for the appointment of HOUSE PHYSICIAN, to become vacant on Monday, 16th July, 1956. Appointment will be for a period of 6 months. National Health Service salary.

Applications to reach the Secretary on or before Monday, 25th June, 1956, together with copies of 3 recent testimonials.

LONDON HOSPITAL, Whitechapel, E.1. Applications are invited for the post of REGISTRAR in General Surgery at the London Hospital Annexe at Brentwood, Essex. The successful candidate would be required to be resident or live within the vicinity. A house is available if desired. A higher qualification is essential.

Applications (12 copies), giving the names and addresses of 3 referees, should be received by the undersigned by 9th July, 1956. H. BRIERLEY, House Governor.

LONDON JEWISH HOSPITAL, Stepney Green, London, E.1. (130 Beds.) HOUSE PHYSICIAN (pre- or post-registration) required for 6 months commencing 5th July, 1956.

Applications, with copies of testimonials, to be sent to the Hospital Secretary.

LAMBETH HOSPITAL, Brook-drive, S.E.11. South WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited from registered medical practitioners for the post of SURGICAL REGISTRAR. The appointment is normally for 2 years, but is subject to review at the end of 1 year. It is recognised for the F.R.C.S. Duties include general surgery and some genito-urinary work. The post is resident or non-resident, but if the latter the successful applicant will be required to sleep in on nights on duty.

Forms of application (enclosing stamped addressed envelope) from the Secretary of the Hospital, to whom all applications should be returned not later than 7th July, 1956.

LAMBETH HOSPITAL, Brook-drive, S.E.11. Applications are invited from pre-registration and registered medical practitioners for the position of RESIDENT HOUSE SURGEON vacant on 23rd July, 1956. The successful candidate will be required to carry out a fortnight's locum duty starting on 9th July, 1956.

Application forms from Physician-Superintendent. Stamped addressed envelope should be enclosed.

LAMBETH HOSPITAL, Brook-drive, S.E.11. Applications are invited from pre-registration and registered medical practitioners for the position of RESIDENT HOUSE PHYSICIAN vacant on 1st August, 1956. The successful candidate will be required to carry out a fortnight's locum duty starting on 18th July, 1956.

Application forms from the Physician-Superintendent. Stamped addressed envelope should be enclosed.

NATIONAL HOSPITALS FOR NERVOUS DISEASES. Applications are invited from registered medical practitioners for the appointment of HOUSE PHYSICIAN at The National Hospital, Queen-square, W.C.1. This post carries the grade of Registrar. The appointment will be for 1 year and will be renewed in exceptional circumstances.

Applications, with names of 3 referees, to be sent to the undersigned not later than 2nd July, 1956.

H. EWART MITCHELL, Secretary to the Board of Governors.

The National Hospital, Queen-square, W.C.1.

NEW END HOSPITAL, Hampstead, N.W.3. Department OF ENDOCRINOLOGY. Applications are invited for the position of HOUSE PHYSICIAN (pre-registration), vacant 18th July, 1956.

Applications, stating age, qualifications, experience, together with copies of 2 recent testimonials, and the name of 1 referee, to Surgeon-Superintendent by 2nd July, 1956.

NORTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD.

REGISTRAR in Thoracic Surgery (non-resident), North Middlesex Hospital and Annexes, Edmonton, N.18.

E.N.T. REGISTRAR (non-resident), Whipps Cross Hospital, E.11. Some duties at Park House Health Centre, E.N.T. Clinic.

PÆDIATRIC REGISTRAR (non-resident), Queen Elizabeth Hospital for Children, E.2, and Hackney Hospital, E.9. Experience in diseases of children essential. Appointment vacant 1st August, 1956.

GERIATRIC REGISTRAR (resident, flat available for married applicant, furnished or unfurnished), Rochford General Hospital, Rochford, Essex. 120 Beds and Outpatient Clinic ; Consultant in charge. Facilities for investigation, treatment, and rehabilitation of acute and chronic sick.

GERIATRIC REGISTRAR (non-resident), Langthorne Hospital, Leytonstone, E.11. Excellent experience in most modern methods of treatment ; Consultant in charge. Full consultant cover in other specialities.

SURGICAL REGISTRAR (non-resident, sleeping in on duty nights), North Middlesex Hospital and Annexes, Edmonton, N.18. Mainly general and traumatic surgery, duties may include teaching.

SURGICAL REGISTRAR (resident), Connaught Hospital, Walthamstow, E.17. Recognised for F.R.C.S.

ANÆSTHETIC REGISTRAR (resident), Poplar Hospital, E.14. Recognised for D.A. and F.F.A.R.C.S.

ORTHOPÆDIC AND GENERAL SURGICAL REGISTRAR (resident), Metropolitan Hospital, E.8. Candidates must possess F.R.C.S.

Appointments subject to review after 1 year.

Application forms from Secretary, 11A, Portland-place, W.1, to be returned by 7th July, 1956.

NORTH MIDDLESEX HOSPITAL, Edmonton, N.18. Applications are invited from pre-registration and registered medical practitioners for the post of RESIDENT HOUSE SURGEON (general surgery). 6 months appointment ; vacant 1st August, 1956. Recognised for F.R.C.S. (Eng.).

Applications, stating age, nationality, qualifications, experience, with copies of recent testimonials, to Secretary of Hospital by 2nd July.

POPLAR HOSPITAL, East India Dock-road, E.14. House PHYSICIAN (Senior House Officer grade) required at above Hospital. Duties include inpatient, outpatient and casualty work. Post vacant now.

Applications, stating age, qualifications and nationality, to Group Secretary, Bow Group Hospital Management Committee, 2A, Bow-road, E.3.

QUEEN MARY'S HOSPITAL, Roehampton, London, S.W.15. (532 Beds.) SURGICAL REGISTRAR required whole-time. 6 months in post count towards F.R.C.S. final. National Health Service terms and conditions.

Detailed applications (9 copies), giving nationality, date of birth, qualifications, experience, present appointments, and names of 3 referees, should reach the Secretary, Ministry of Health, Division 4(v), Norcross, Blackpool, Lancs, by 14th July, 1956.

ST. JAMES' HOSPITAL, Balham, London, S.W.12. Locum REGISTRAR (anæsthetics) required from 7th July to 6th August.

Applications, giving full particulars and names of 2 referees, to Group Secretary at above address, immediately. (42488.)

ROYAL MARSDEN HOSPITAL, Fulham-road, S.W.3. Applications are invited for the post of SENIOR REGISTRAR (E.N.T. Department). The post, which is for 4 sessions a week on fixed days, is for 1 year, eligible for re-appointment. Candidates must hold the Diploma of F.R.C.S.

Forms of application are obtainable from the House Governor, to whom applications, together with names of 3 referees, should be sent not later than 30th June.

ROYAL NATIONAL ORTHOPÆDIC HOSPITAL, 234, Great Portland-street, London, W.1. Applications are invited for the appointment of SENIOR ORTHOPÆDIC REGISTRAR (full-time), non-resident, duties to commence as soon as possible. Applicants must be Fellows of 1 of the Royal Colleges of Surgeons. During the tenure of office 1 year may be spent at the Luton and Dunstable Hospital and 6 months at The Hospital for Sick Children, Great Ormond-street. In the event of a Registrar of the Royal National Orthopædic Hospital being appointed to the above vacancy, there will be a vacancy for the post of Registrar and applicants may, therefore, apply for either post.

Applications to be received not later than 4th July. Forms of application can be obtained from the House Governor, 234, Great Portland-street, London, W.1.

ST. ANN'S GENERAL HOSPITAL, N.15. Applications are invited from registered medical practitioners for the post of RESIDENT HOUSE PHYSICIAN (Senior House Officer) to Pædiatric and Infectious Diseases Department for a period of 6 months from 21st July, 1956.

Application form from Secretary, Tottenham Group Hospital Management Committee, The Green, N.15, to be returned by 2nd July, 1956.

ST. ANN'S GENERAL HOSPITAL, N.15. (756 Beds.) Applications are invited from registered medical practitioners for the appointment of RESIDENT HOUSE PHYSICIAN (Senior House Officer) for duty in the Infectious Diseases Unit and other general duties, for a period of 6 months, commencing 8th July, 1956.

Application form from Secretary, Tottenham Group Hospital Management Committee, The Green, Tottenham, N.15, to be returned by 2nd July, 1956.

ST. ANDREW'S HOSPITAL, Bow, E.3. Applications are invited for the appointment of HOUSE SURGEON. Recognised pre-registration post. Vacant on 14th July, 1956. Post is tenable for 6 months.

Applications, stating age and qualifications with copies of at least 1 testimonial, should be sent immediately to the Hospital Secretary, St. Andrew's Hospital, Bow, E.3.

ST. MARK'S HOSPITAL FOR DISEASES OF THE RECTUM AND COLON, City-road, London, E.C.1. CLINICAL ASSISTANTS (honorary) required in Outpatient Clinics on Thursday afternoons and Saturday mornings.

Further information can be obtained from the Secretary.

ST. THOMAS'S HOSPITAL, London, S.E.1. Resident REGISTRAR to the Department of Obstetrics and Gynæcology. For a period of 1 year in the first instance.

Applications, naming 2 referees, to the Clerk of the Governors by 7th July, 1956.

UNIVERSITY COLLEGE HOSPITAL, Gower-street, W.C.1. Applications are invited for the post of SENIOR REGISTRAR in the Department of Clinical Pathology for 1 year in the first instance. Applicants should have experience in all branches of pathology.

Applications, with names of 2 referees, to Administrator and Secretary by 30th June, 1956.

WHITTINGTON HOSPITAL, London, N.19. Applications are invited for the post of SENIOR HOUSE OFFICER (anæsthetics), vacant 1st July, 1956. Post recognised for F.F.A.R.C.S.

Applications, stating age, qualifications and experience, with copies of 2 recent testimonials and name of 1 referee, to Medical Superintendent by 30th June, 1956.

WHITTINGTON HOSPITAL, London, N.19. Locum Tenens REGISTRAR in Medicine (general) required 2nd July for 2 months. Non-resident but is required to sleep in when on full duty. Should be Member of R.C.P.(Lond.).

Applications, stating age, qualifications and experience, with name of 1 referee, to the Medical Superintendent immediately.

WILLESDEN GENERAL HOSPITAL, Harlesden-road, N.W.10. RESIDENT CASUALTY OFFICER (Senior House Officer) wanted 19th July. Post recognised for Fellowship.

Applications, with full particulars and names of 2 referees, to Hospital Secretary by 4th July, 1956.

WHIPPS CROSS HOSPITAL, London, E.11. Applications are invited for the post of HOUSE SURGEON (pre-registration) in the Orthopædic Department. Post recognised for the F.R.C.S., vacant now.

Application forms from the Hospital Secretary to be returned by 2nd July, 1956.

WESTMINSTER CHILDREN'S HOSPITAL, Westminster HOSPITAL TEACHING GROUP. SURGICAL REGISTRAR required from 1st October, 1956, initially for 1 year.

Apply, naming 3 referees, to the Secretary, Westminster Children's Hospital, Vincent-square, S.W.1, by 9th July, 1956.

WESTMINSTER CHILDREN'S HOSPITAL, Westminster HOSPITAL TEACHING GROUP. HOUSE SURGEON (pre-registration) required for 6 months from 1st September, 1956.

Applications, with copies of recent testimonials, should be sent to the Secretary, Westminster Children's Hospital, Vincent-square, S.W.1, by 9th July, 1956.

WESTMINSTER HOSPITAL, St. John's-gardens, S.W.1. Applications invited for post of SENIOR RESIDENT AND CASUALTY OFFICER (Male), Registrar grade, for 1 year in first instance from 1st October, 1956. Board residence £218 p.a.

Applications (8 copies), with names of 2 referees, to House Governor by 7th July.

WESTMINSTER HOSPITAL, St. John's-gardens, S.W.1. Applications are invited for post of RESIDENT MEDICAL OFFICER (Female) at Parkwood Auxiliary Hospital, Swanley, Kent, for 1 year in the first instance and renewable. Graded as Junior Hospital Medical Officer. A deduction of £170 p.a. will be made from salary for board-residence. The post offers opportunity for study.

Applications (4 copies), with names of 2 referees, to House Governor.

ABERDEEN GENERAL HOSPITALS BOARD OF MANAGEMENT. Applications are invited for the appointment of a REGISTRAR in Otolaryngology with duties in the Aberdeen Royal Infirmary. The post which becomes vacant from 5th October, 1956, is a whole-time one and is non-resident. Salary and conditions of service in accordance with the terms issued by the Department of Health for Scotland.

Applications, giving details of qualifications and experience, with the names of 2 referees, should be lodged with the Group Secretary, Aberdeen General Hospitals, P.O. Box 92, 62, Queen's-road, Aberdeen, within 14 days of the appearance of this advertisement.

ABBOTS LANGLEY, Watford, Hertfordshire. LEAVES-DEN HOSPITAL. (2250 Beds. Recognised for D.P.M.) NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR in Psychiatry (mental deficiency) at above Hospital. Resident accommodation available. Hospital may be visited by direct appointment with Physician-Superintendent.

Application forms obtainable from, and returnable to, Group Secretary, Leavesden Hospital, Abbots Langley, Watford, Herts, by 14th July, 1956.

ALTON GENERAL HOSPITAL, Alton. (136 Beds.) Applications are invited from registered medical practitioners for the post of RESIDENT HOUSE PHYSICIAN (Senior House Officer grade) with some experience of anæsthetics. Useful experience to be obtained in general medicine. The appointment is for 6 months in first instance. Vacant early July.

Applications, stating age, qualifications, and experience, together with copies of 2 testimonials, to Group Secretary, Winchester Group Hospital Management Committee, Royal Hampshire County Hospital, Winchester.

ALTON GENERAL HOSPITAL, Alton. (136 Beds.) HOUSE SURGEON (Senior House Officer grade) required to assist in steadily expanding surgical work including casualty at this Hospital which is being developed. Post vacant middle of August.

Applications, with copies of 2 testimonials, to be sent to the Group Secretary, Winchester Group Hospital Management Committee, Royal Hampshire County Hospital, Winchester.

ASHTON, HYDE AND GLOSSOP HOSPITAL MANAGE-MENT COMMITTEE. Applications are invited for the whole-time post of REGISTRAR in Chest Diseases in the Ashton, Hyde and Glossop Group and Oldham and District Group of Hospitals. The post offers wide experience in both outpatient clinics and pulmonary hospitals. Residential accommodation may be arranged.

Applications to the Group Secretary, Ashton, Hyde and Glossop Hospital Management Committee, Ashton-under-Lyne General Hospital, Ashton-under-Lyne, Lancashire.

ASHTON, HYDE AND GLOSSOP HOSPITAL MANAGE-MENT COMMITTEE. HOUSE OFFICER (pædiatrics) required at Ashton-under-Lyne General Hospital. Modern Pædiatric Unit, good neonatal and premature baby experience. Recognised for D.C.H. Vacant September.

Applications, with copies of 2 testimonials, to Group Secretary, General Hospital, Ashton-under-Lyne, Lancs.

ASHTON, HYDE AND GLOSSOP HOSPITAL MANAGE-MENT COMMITTEE. 2 HOUSE PHYSICIANS required at Ashton-under-Lyne General Hospital. 1 post vacant end of July, 1 vacant mid-August. Preference given to pre-registration candidates.

Applications, with copies of 2 testimonials, to Group Secretary, General Hospital, Ashton-under-Lyne, Lancs.

AYLESBURY, BUCKINGHAMSHIRE. STOKE MANDE-VILLE HOSPITAL. RESIDENT HOUSE PHYSICIAN for the Neurological Unit (a part of the Department of Neurology of the United Oxford Hospitals). Vacant 25th July, 1956. Recognised pre-registration post, also open to registered practitioners, in which case status up to Senior House Officer may be awarded.

Applications, with copies of 2 testimonials, to the Administrative Officer.

BARNSTAPLE. NORTH DEVON INFIRMARY. (105 Beds.) HOUSE SURGEON (pre-registration). Post vacant mid-July.

Applications to Group Secretary, North Devon Hospital Management Committee, 19, Alexandra-road, Barnstaple.

BEDFORD GENERAL HOSPITAL. (437 Beds.) House SURGEON required (pre- or post-registration); recognised for F.R.C.S. The appointment offers exceptional opportunities for general experience in busy acute surgical units.

Applications, stating age, experience, nationality, copies of 2 recent testimonials, to Group Secretary, 3, Kimbolton-road, Bedford.

BIDEFORD AND DISTRICT HOSPITAL. (51 Beds.) Applications invited for the post of HOUSE OFFICER from 1st September, 1956. Flat available for married officer.

Applications to Group Secretary, 19, Alexandra-road, Barnstaple, Devon.

BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL. (229 Beds.) ORTHOPÆDIC HOUSE SURGEON (first, second, or third post). Married accommodation available. Offers good opportunity for general experience in busy acute general hospital. Approved pre-registration post. Fully qualified practitioners may apply. Recognised for F.R.C.S. Vacant now.

Apply to Group Secretary.

BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL. ASSISTANT PATHOLOGIST (Senior House Officer grade) required in Area Laboratory with attendance at Branch Laboratory, Driffield. Offers experience all branches of pathology. Salary £745.

Detailed applications to Group Secretary.

BEBINGTON, CHESHIRE. CLATTERBRIDGE HOSPITAL. (783 Beds.) CENTRAL WIRRAL GROUP. JUNIOR HOSPITAL MEDICAL OFFICER (casualty/orthopædics), resident, required at the above Hospital. Salary in accordance with current terms and conditions, i.e., £775–£50–£1075 p.a., less £150 p.a. for residence.

Application forms obtainable from Hospital Secretary, to be returned as soon as possible.

BIRMINGHAM. SOLIHULL HOSPITAL, Lode-lane, SOLIHULL. RESIDENT MEDICAL OFFICER (Senior House Officer), vacant beginning of July. General Hospital. Good experience. 5 other resident medical staff. Resident charge £157 p.a.

Applications, stating age, qualifications and experience, and names of 2 referees, to Medical Superintendent.

BIRMINGHAM. SOLIHULL HOSPITAL, Lode-lane, SOLIHULL.

HOUSE SURGEON, vacant beginning of July.

HOUSE PHYSICIAN, vacant mid-July.

Pre-registration posts. General Hospital offering good experience. 5 other resident medical staff.

Applications, with copies of 2 recent testimonials or names for reference, to Medical Superintendent.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. THE CHILDREN'S HOSPITAL, Ladywood-road, BIRMINGHAM, 16. Applications are invited for the appointment of RESIDENT SENIOR HOUSE OFFICER to work in the Clinical Pathological Department, vacant 11th July, 1956, for 1 year. Applicants should have held resident appointments in a children's hospital or a children's department of a general hospital.

Forms of application may be obtained from the House Governor and should be returned immediately.

G. A. PHALP, Secretary to the Board of Governors.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. THE BIRMINGHAM MATERNITY HOSPITAL. Applications are invited from registered medical practitioners for the post of RESIDENT OBSTETRIC HOUSE SURGEON, vacant 1st September, 1956. The appointment is recognised for the M.R.C.O.G. and D.Obst.R.C.O.G.

Application forms obtainable from the House Governor, the Birmingham and Midland Hospitals for Women, Showell Green-lane, Sparkhill, Birmingham, 11, to be returned not later than 30th June, 1956. G. A. PHALP, Secretary.

BIRMINGHAM, 9. LITTLE BROMWICH GENERAL HOSPITAL. PÆDIATRIC HOUSE PHYSICIAN (Male/Female), vacant 1st August, 1956. Recognised for D.C.H., includes duties in infectious diseases wards and at Neonatal Department and clinics.

Apply Physician-Superintendent.

BISHOP AUCKLAND. THE GENERAL HOSPITAL. (350 Beds.) HOUSE SURGEON required. Recognised pre-registration post. Immediate vacancy.

Apply, naming 2 referees, to Group Secretary, South West Durham Hospital Management Committee, at above address.

BISHOP AUCKLAND. THE GENERAL HOSPITAL. HOUSE OFFICER (obstetrics and gynæcology). Applications invited from registered or pre-registration practitioners. Vacant 1st September, 1956. Recognised for D.Obst.R.C.O.G. Departmental beds 69.

Apply, naming 2 referees, to Group Secretary, South West Durham Hospital Management Committee, at above address.

BLACKBURN AND DISTRICT HOSPITAL MANAGE-MENT COMMITTEE. Applications are invited for the following HOUSE PHYSICIAN posts falling vacant on the dates stated :—

Queen's Park Hospital, Blackburn (640 general beds)
2 required, on 19th and 30th July.

Victoria Hospital, Accrington (114 acute beds)
1 required on 1st August.

All posts recognised for pre-registration purposes.

Apply to Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn, Lancs.

BRISTOL. HAM GREEN HOSPITAL, Pill, near Bristol. HOUSE OFFICER required for the Tuberculosis Wards of the above Hospital. The Hospital is fully equipped for the modern treatment of pulmonary tuberculosis, including regular major thoracic surgery.

Apply Secretary, Ham Green Hospital, Pill, near Bristol.

BRISTOL. COSSHAM/FRENCHAY HOSPITAL MAN-AGEMENT COMMITTEE. SENIOR HOUSE OFFICER required in the Thoracic Surgery Department, which is the Regional Thoracic Surgery Centre (120 Beds) for the South West.

Applications, with full particulars, should be addressed to the Group Secretary, Frenchay Hospital, Bristol, quoting "Thoracic."

BRISTOL. THE BOARD OF GOVERNORS OF THE UNITED BRISTOL HOSPITALS AND THE SOUTH-WESTERN REGIONAL HOSPITAL BOARD. Applications are invited by the above Boards for the joint appointment of SENIOR REGISTRAR in Radiodiagnosis to the North Gloucestershire Clinical Area. The appointment will be held for 1 year in the first instance but may be renewed thereafter on an annual basis. The successful candidate will be appointed to work for the first year mainly at the Cheltenham General, Eye and Children's Hospital but will be required to visit other hospitals in the Clinical Area as determined by the Regional Board from time to time.

Applications, stating date of birth, qualifications and experience, together with the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 4th July, 1956.

BRISTOL. THE BOARD OF GOVERNORS OF THE UNITED BRISTOL HOSPITALS AND THE SOUTH-WESTERN REGIONAL HOSPITAL BOARD. Applications are invited by the above Boards for the joint appointment of REGISTRAR in General Surgery. This post becomes vacant on 1st September, 1956. The appointment will be held for 1 year in the first instance and be renewable for a further year. The successful candidate will be appointed to work for the first year in the Bath Group of hospitals but may be required to undertake duties in other hospitals in the area.

Applications, stating date of birth, qualifications and experience together with the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 30th June, 1956.

BRISTOL. THE BOARD OF GOVERNORS OF THE UNITED BRISTOL HOSPITALS AND THE SOUTH-WESTERN REGIONAL HOSPITAL BOARD. Applications are invited by the above Boards for the joint appointment of REGISTRAR to the South West Regional Blood Transfusion Centre at Southmead, Bristol. This post becomes vacant on 1st November, 1956. The appointment, which is non-resident, will be held for 1 year. Duties include serological and hæmatological work in the laboratories, clinical work at Southmead Hospital and attendance at blood-collecting sessions. Facilities are provided for participation in research. Previous experience of blood-bank work in a hospital pathological department is essential.

Applications, stating date of birth, qualifications and experience together with the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 30th June, 1956.

BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL; BRIGHTON GENERAL HOSPITAL. 2 RESIDENT ANÆSTHETISTS (Senior House Officer grade) required for 1 year—6 months at each Hospital, by interchange of duties, with facilities for working in specialised hospitals within the Brighton and Lewes Group. Posts recognised for F.F.A.R.C.S. and D.A., and vacant early July and mid-August.

Applications, stating age, nationality and experience, naming 2 referees, to the Administrative Officer, Royal Sussex County Hospital, Brighton, 7.

BRIGHTON. ROYAL ALEXANDRA HOSPITAL FOR SICK CHILDREN, Dyke-road. (129 Beds.) SENIOR HOUSE OFFICER. Candidates should have had experience in pædiatrics. The post is recognised for D.C.H.

Applications, stating age, nationality, experience, together with copies of 2 testimonials and the names of 2 referees, should reach the Administrative Officer not later than 2nd July, 1956.

BURY AND ROSSENDALE HOSPITAL MANAGEMENT COMMITTEE. BURY GENERAL HOSPITAL. Applications are invited for the post of HOUSE OFFICER (surgery), pre-registration.

Applications, stating age, qualifications, and names of 2 referees, should be forwarded to—

H. WILKINSON, Group Secretary.

Bury General Hospital, Bury, Lancs.

BURY AND ROSSENDALE HOSPITAL MANAGEMENT COMMITTEE. BURY GENERAL HOSPITAL. Applications are invited for the post of SENIOR HOUSE OFFICER in Casualty and Orthopædics which will become vacant on 31st July, 1956.

Applications, stating details of experience, qualifications and names of 2 referees, to H. WILKINSON, Group Secretary.

Bury General Hospital, Bury, Lancs.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (277 Beds.) GYNÆCOLOGICAL HOUSE SURGEON required at Highland Court Annexe, a unit of 25 gynæcological beds situated 3 miles from the above Hospital, with all ancillary services available. Recognised for M.R.C.O.G. 6 months appointment. Post vacant early July, 1956. National Health Service salary and conditions.

Applications, together with copies of 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CARSHALTON, SURREY. QUEEN MARY'S HOSPITAL FOR CHILDREN. (A General Children's Hospital of 853 Beds.) HOUSE SURGEON (resident) for acute general surgery required for 6 months. Applicants must have completed 12 months Pre-registration Service.

Applications, stating age and qualifications together with 1 recent testimonial and the names of 2 referees, should be submitted to the Group Secretary by 7th July, 1956.

CARSHALTON. QUEEN MARY'S HOSPITAL FOR CHILDREN. (853 Beds.) SURGICAL AND ORTHOPÆDIC REGISTRAR required for duties which include 60 orthopædic beds and shared registrar responsibility for 60 acute and general beds. Applicants are invited to visit the Hospital by appointment with the Physician-Superintendent.

Applications which should be made on forms obtainable from the Group Secretary, should be returned by 7th July, 1956.

CHELMSFORD. ST. JOHN'S AND THE CHELMSFORD AND ESSEX HOSPITALS. Locum MEDICAL AND PÆDIATRIC REGISTRAR (resident) required to commence 3rd August, 1956.

Apply to the Secretary, Chelmsford Group Hospital Management Committee, Chelmsford and Essex Hospital, London-road, Chelmsford, Essex.

CHELMSFORD HOSPITALS. Applications are invited for the post of RESIDENT ANÆSTHETIST (Senior House Officer) to large surgical units, for a period of 12 months.

Applications, stating age, qualifications and experience, with recent testimonials, should be sent to the Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford.

CARDIFF. UNITED CARDIFF HOSPITALS. Applications are invited for the post of REGISTRAR in Ophthalmology at the Cardiff Royal Infirmary, vacant 17th August.

Application forms are available from the Secretary to the Board, United Cardiff Hospitals, Cardiff Royal Infirmary, Cardiff, and should be returned within 14 days of the appearance of this advertisement.

CARDIFF. UNITED CARDIFF HOSPITALS. Applications are invited for the post of SENIOR REGISTRAR in the Department of Anæsthetics, vacant 15th October. The successful candidate will work both in the teaching and in other hospitals within the Cardiff area, and will be expected to assist in the teaching and research work of the department. Preference will be given to candidates with the F.F.A.R.C.S.

Application forms are available from the Secretary to the Board, United Cardiff Hospitals, Cardiff Royal Infirmary, Cardiff, and should be returned not later than 14 days from the appearance of this advertisement.

CARDIFF. UNITED CARDIFF HOSPITALS. Applications are invited for the post of SENIOR HOUSE OFFICER in Orthopædics at the Cardiff Royal Infirmary, vacant 1st September.

Application forms are available from the Secretary to the Board, United Cardiff Hospitals, Cardiff Royal Infirmary, Cardiff, and should be returned within 14 days of the appearance of this advertisement.

CAMBRIDGE. ADDENBROOKE'S HOSPITAL. House SURGEON to the Orthopædic Department for 6 months from early August, 1956. Recognised Pre-registration Service.

Apply, stating age, nationality, qualifications and experience with dates, and copies of 3 testimonials, to the Secretary by 7th July. Interviews mid-July.

CHELTENHAM GENERAL EYE AND CHILDREN'S HOSPITAL. (CHILDREN'S DEPARTMENT.) Applications are invited for the post of RESIDENT MEDICAL OFFICER (Senior House Officer grade) for the Children's Department (54 Beds). The appointment, which is recognised for candidates entering for the D.C.H., offers scope for wide experience in all departments of paediatrics, surgical cases, and attendance at outpatient departments at the General Hospital. Previous hospital experience in paediatrics is desirable.

Applications, together with copies of 3 testimonials, should be addressed to S. T. DAVIS, Group Secretary.

General Hospital, Cheltenham.

CHESTERFIELD HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of a JUNIOR HOSPITAL MEDICAL OFFICER at Whittington Hall Hospital (400 Beds for mental defectives) and Scarsdale Hospital (125 Beds for mental patients). Small house available near Scarsdale Hospital. Ample opportunities for study. Previous experience in psychiatry not essential.

Applications, with names of referees, to the Group Secretary, Royal Hospital, Chesterfield.

CHICHESTER. ROYAL WEST SUSSEX HOSPITAL. (202 acute beds.) SENIOR HOUSE SURGEON (Deputy Resident Surgical Officer) required at above Hospital. Post recognised for F.R.C.S. Resident staff of 6—Resident Surgical Officer, 3 House Surgeons, Resident Medical Officer, and House Physician. Salary £745 p.a., less residential charge. Vacant 1st July, 1956.

Applications, stating age, experience, qualifications, with references or names of referees, to Senior Administrative Officer.

COATBRIDGE, AIRDRIE AND DISTRICT HOSPITALS BOARD OF MANAGEMENT. Applications are invited for the following RESIDENT JUNIOR HOSPITAL MEDICAL OFFICER posts :—

(*a*) For duty in Tuberculosis Wards and Thoracic Unit at Hairmyres Hospital, East Kilbride.

(*b*) To undertake the immediate medical supervision of the following hospitals :—

Lightburn I.D. Hospital and Sanatorium, Shettleston. Coathill Hospital, Coatbridge (I.D. and geriatric patients).

The resident accommodation in the case of (*b*) is located at Lightburn Hospital. Both appointments are subject to the provisions of the National Health Service superannuation scheme. Salary scale, £775–£1075 p.a.

Applications, stating age and nationality, and giving details of training, qualifications and experience together with the names of not more than 3 referees, should be lodged, not later than 7 days from the date of publication of this advertisment, with the Group Secretary, Hairmyres Hospital, East Kilbride.

COLCHESTER. ESSEX COUNTY HOSPITAL. (188 Beds.) Applications invited for post of HOUSE OFFICER (surgical). First, second, third, or pre-registration post, tenable for 6 months.

Applications, with copies of 3 testimonials, to Group Secretary, Colchester Hospital Management Committee, 14, Pope's-lane, Colchester, Essex.

COLCHESTER. ESSEX COUNTY HOSPITAL. (188 Beds.) Applications invited for post of HOUSE PHYSICIAN. First, second, third, or pre-registration post, tenable for 6 months.

Applications, with copies of 3 testimonials, to Group Secretary, Colchester Hospital Management Committee, 14, Pope's-lane, Colchester, Essex.

CROYDON, GENERAL HOSPITAL. (200 Beds.) **Croydon GROUP HOSPITAL MANAGEMENT COMMITTEE, SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD.** MEDICAL REGISTRAR (whole-time), commencing 1st September. Candidate should be experienced Medical Officer and possession of higher qualification in medicine an advantage.

Application forms obtainable from GEORGE A. PAINES, Group Secretary, Hospital Management Committee, General Hospital, Croydon, to be returned immediately.

DOUGLAS. NOBLE'S ISLE OF MAN HOSPITAL. (160 Beds.) Applications are invited for post of HOUSE PHYSICIAN at this busy Hospital, which has been approved for Pre-registration Service. The post, which becomes vacant 1st September, 1956, offers varied experience. 4 residents on the staff. Salary scale £425–£475–£525, according to experience.

Applications, stating full details, with copies of 2 recent testimonials, to the Secretary, Noble's Hospital, Douglas, Isle of Man.

DERBY. CITY HOSPITAL. 2 House Physicians (pre-registration) or SENIOR HOUSE OFFICERS. 1 vacant 26th August, the other vacant 11th September.

Apply, stating full details with copies of 2 recent testimonials, to Medical Superintendent.

DERBY. CITY HOSPITAL. 2 House Surgeons (pre-registration) or SENIOR HOUSE OFFICERS (surgical). The posts are recognised for the F.R.C.S. 1 vacant 26th August, the other vacant 11th September.

Apply, stating full details with copies of 2 recent testimonials, to the Medical Superintendent.

DERBY. DERBYSHIRE ROYAL INFIRMARY. Senior HOUSE OFFICER (anæsthetics), now vacant. Recognised for D.A.

Apply immediately, stating full details with copies of 2 recent testimonials, to Secretary.

DERBY. DERBYSHIRE ROYAL INFIRMARY. Senior HOUSE OFFICER (E.N.T.), now vacant. Recognised for F.R.C.S. Duties include attendance at 2 other hospitals within the Group.

Apply immediately, with copies of 2 recent testimonials, to Secretary.

DERBY. DERBYSHIRE CHILDREN'S HOSPITAL. (86 Beds.) HOUSE SURGEON (pre-registration) or SENIOR HOUSE OFFICER, vacant 29th July. Recognised for D.C.H.

Apply immediately, stating full particulars and 2 names for reference, to Group Secretary, No. 1 Hospital Management Committee, Babington-lane, Derby.

DURHAM HOSPITAL MANAGEMENT COMMITTEE.

Dryburn Hospital, Durham (303 Beds)

HOUSE PHYSICIANS (general medicine). 2 vacancies. Approved pre-registration posts.

HOUSE SURGEON (general surgery). Approved pre-registration post, and recognised under the F.R.C.S. regulations.

SENIOR HOUSE OFFICERS. 2 vacancies. 1 in general surgery and 1 in a shared post covering E.N.T., eyes, and general surgery.

HOUSE PHYSICIAN required for Pædiatric Unit of 42 Beds. Approved pre-registration appointment and recognised for D.C.H.

General Hospital, Chester-le-Street (204 Beds)

HOUSE PHYSICIAN (general medicine). Approved pre-registration post.

SENIOR HOUSE OFFICER in General Medicine.

HOUSE SURGEON (general surgery). Approved pre-registration post.

All the above posts will be vacant on 1st August, 1956.

Apply, with names and addresses of 2 referees, to the Group Secretary, Dryburn Hospital, Durham.

EXETER. ROYAL DEVON AND EXETER HOSPITAL. Applications are invited from registered medical practitioners for the appointment of SENIOR HOUSE OFFICER (surgical), Resident Surgical Officer. The post is recognised for the F.R.C.S. examination. Vacant 21st July, 1956.

Applications, with copies of 2 recent testimonials, to the Hospital Secretary.

EAST CUMBERLAND HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following appointments for the 6-month period commencing 1st August, 1956 :—

Cumberland Infirmary, Carlisle (336 Beds)

1 HOUSE OFFICER, general medicine.

2 HOUSE OFFICERS, general surgery (recognised for F.R.C.S. examination).

1 HOUSE OFFICER, gynæcology and obstetrics.

City Maternity (65 Beds) **and City General** (188 Beds) **Hospitals, Carlisle**

1 HOUSE OFFICER, obstetrics and gynæcology (recognised for the D.Obst.R.C.O.G. examination).

All the above posts are recognised for pre-registration purposes.

Applications are also invited for the appointment of SENIOR HOUSE OFFICER, general medicine, for a period of 1 year, at the Cumberland Infirmary, Carlisle.

Applications, stating age, giving details of education, training and experience, together with the names of 2 referees, should be sent to the Group Secretary, Cumberland Infirmary, Carlisle.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. MEDICAL REGISTRAR, North Cambridgeshire and Clarkson Hospitals, Wisbech (271 Beds). Post provides experience in general medicine, pædiatrics and geriatrics, also facilities for study. Flat available near hospitals. Appointment for 1 year, renewable for second year.

Applications, stating age, experience, and the names of 3 referees, to the Board's Senior Administrative Medical Officer 117, Chesterton-road, Cambridge, by 2nd July, 1956. Candidates invited to visit Hospital by direct arrangement with Hospital Management Committee Secretary, North Cambs. Hospital, Wisbech.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. (1) SURGICAL REGISTRAR, North Cambridgeshire Hospital, Wisbech. Post provides good training and experience in both general and orthopædic surgery. Appointment for 1 year, renewable for second year. Candidates invited to visit the hospital by direct arrangement with Hospital Management Committee Secretary at the Hospital.

(2) REGISTRAR in Geriatrics, Norfolk and Norwich Group of hospitals (total geriatric beds 590). Main hospital is the West Norwich Hospital where the Geriatric Department is the pivotal point of the area service which is being developed on active lines under the Consultant Physician in Geriatrics. Appointment for 1 year, renewable for second year. Candidates invited to visit hospital by direct arrangement with Hospital Management Committee Secretary, Norfolk and Norwich Hospital.

Applications, stating age, experience and the names of 3 referees, to the Board's Senior Administrative Medical Officer, 117, Chesterton-road, Cambridge, by 9th July, 1956.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. SURGICAL REGISTRAR, Ipswich and East Suffolk Hospital. Post recognised for F.R.C.S. Appointment for 1 year, renewable for second year.

Applications, stating age, experience and the names of 3 referees, to the Board's Senior Administrative Medical Officer, 117, Chesterton-road, Cambridge, by 2nd July, 1956. Candidates invited to visit Hospital by direct arrangement with Hospital Management Committee Secretary, Ipswich and East Suffolk Hospital (Anglesea Road Wing), Ipswich.

EDINBURGH NORTHERN GROUP OF HOSPITALS. SENIOR HOUSE OFFICER required for Department of Radiotherapy, Western General Hospital. This post is now vacant and will be for 6 months in the first instance.

Applications, with names of 2 referees, to the Medical Superintendent, Western General Hospital, Edinburgh, 4.

EDINBURGH CENTRAL HOSPITALS BOARD OF MANAGEMENT. Applications are invited from registered medical practitioners and pre-registration graduates, for resident appointments for 6 months commencing 1st October, 1956. National Health Service scale.

Royal Hospital for Sick Children
2 HOUSE SURGEONS.
1 HOUSE SURGEON (E.N.T.).
1 HOUSE PHYSICIAN.
Princess Margaret Rose Hospital
2 HOUSE SURGEONS.
Chalmers Hospital
1 HOUSE PHYSICIAN.
1 HOUSE SURGEON.
1 HOUSE SURGEON (gynæcological and Children's Surgical Annexe).

Applications, stating age, qualifications and experience, and names of 2 referees, to be sent within 14 days to Medical Superintendent, 18, Rillbank-terrace, Edinburgh, 9.

ENFIELD, MIDDLESEX. CHASE FARM HOSPITAL. RESIDENT HOUSE SURGEON (approved pre-registration), vacant 2nd August, 1956. Duties with a general Surgical Unit doing some orthopædic work. Post recognised by the Royal College of Surgeons. 6 months appointment.

Applications, with the names and addresses of 2 referees, to the Secretary of the Management Committee, Enfield Group Hospital Management Committee.

EPSOM, SURREY. THE MANOR HOSPITAL. Applications are invited for the appointment of SENIOR HOUSE OFFICER or JUNIOR HOSPITAL MEDICAL OFFICER at The Manor—a hospital with specialised facilities for the socio-industrial habilitation of high-grade defectives. This hospital is recognised by the Conjoint Board for 12 of the 24 months training required under the D.P.M. regulations.

Apply, with names of 2 referees, to Physician-Superintendent.

EPSOM DISTRICT HOSPITAL, Dorking-road, Epsom, SURREY. RESIDENT HOUSE SURGEON required 5th August. Pre-registration post, recognised for F.R.C.S.

Applications, stating age, qualifications and experience with copies of 2 recent testimonials, should be sent as soon as possible to Group Secretary, at above address.

EPSOM DISTRICT HOSPITAL, Dorking-road, Epsom, SURREY. RESIDENT HOUSE SURGEON required 1st July, for Orthopædic, E.N.T. and Eye Departments. Pre-registration post.

Applications, stating age, qualifications and experience with copies of 2 recent testimonials, should be sent immediately to Group Secretary at above address.

FARNBOROUGH HOSPITAL, Kent. (800 Beds.) ORTHOPÆDIC SENIOR HOUSE OFFICER required for 1 year from 1st July. Recognised for F.R.C.S. Deduction for residence £150.

Apply, stating age, qualifications with dates, and experience, and naming 3 referees, to Administrative Officer immediately.

GLASGOW ROYAL INFIRMARY. Senior House Officer in Radiodiagnosis. Duties at above Infirmary.

Apply in writing, giving 3 names for reference, not later than 30th June, 1956, to the Secretary, Board of Management for Glasgow Royal Infirmary and Associated Hospitals, 135, Buchanan-street, Glasgow, C.1.

GLASGOW ROYAL INFIRMARY AND ASSOCIATED HOSPITALS BOARD OF MANAGEMENT. SENIOR HOUSE OFFICER in Bacteriology based at Glasgow Royal Infirmary.

Write, giving 3 names for reference, not later than 30th June, 1956, to the Secretary, Board of Management for Glasgow Royal Infirmary and Associated Hospitals, 135, Buchanan-street, Glasgow, C.1.

GRIMSBY GROUP OF HOSPITALS. Sheffield Regional HOSPITAL BOARD. Whole-time RESIDENT or NON-RESIDENT REGISTRAR (obstetrics and gynæcology) required. Post vacant 1st September. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 2nd July, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

GUILDFORD. ROYAL SURREY COUNTY HOSPITAL. (232 Beds.) CASUALTY OFFICER required. The post is recognised for F.R.C.S. examination and the grading is that of Senior House Officer. 2 Casualty Officers are employed who share the work of the department, which is part of the Orthopædic and Traumatic Unit. Regular instruction is given in traumatic surgery and the Casualty Officers take part in the work of the fracture clinics. Post is vacant on 9th July.

Applications, with copies of testimonials, to Hospital Secretary.

HALIFAX. ST. JOHN'S HOSPITAL. Senior House OFFICER in Geriatrics required. Good facilities for modern method of treating geriatric cases. Post vacant 1st August. Salary £745 p.a., with deduction of £130 p.a. for board-residence, &c.

Applications to be forwarded to the Group Secretary, Royal Halifax Infirmary, Halifax.

HALIFAX GENERAL HOSPITAL. (425 Beds.) Senior HOUSE OFFICER in Anæsthetics required. Post recognised for D.A. Salary £745 p.a., less £130 p.a. for board-residence, &c.

Applications to be forwarded to the Group Secretary, Royal Halifax Infirmary, Halifax.

HALIFAX. NORTHOWRAM HALL HOSPITAL. (108 Beds.) SENIOR HOUSE OFFICER in Chest Diseases required. Duties include attendance at busy Chest Clinic at the Royal Halifax Infirmary and non-tuberculous chest ward work. This post offers excellent facilities for the study of chest diseases. Salary £745 p.a. with deduction of £130 p.a. for board, residence, &c.

Applications to be forwarded to the Group Secretary, Royal Halifax Infirmary, Halifax.

HALIFAX. ROYAL HALIFAX INFIRMARY. (301 Beds.) SENIOR HOUSE OFFICER in General Surgery required. Post vacant July. Salary £745 p.a., with deduction of £130 p.a. for board-residence, &c.

Applications to be forwarded to the Group Secretary, Royal Halifax Infirmary, Halifax.

HALIFAX. ROYAL HALIFAX INFIRMARY. (301 Beds.) SENIOR HOUSE OFFICER in Casualty and Orthopædic Surgery required. Post recognised for F.R.C.S. Salary £745 p.a., with deduction of £130 p.a. for board, residence, &c.

Apply to the Group Secretary, Royal Halifax Infirmary, Halifax.

HAILSHAM. HELLINGLY HOSPITAL. Hailsham HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners (Male or Female) for the whole-time post of JUNIOR HOSPITAL MEDICAL OFFICER at the above Hospital. The post is a trainee appointment and offers experience in all branches of adult psychiatry. In addition, opportunities can be afforded for some experience in neurology and mental deficiency. The Hospital has a high admission-rate and is recognised for the D.P.M. Married or single accommodation is available.

Applications, giving the names of 3 referees, should be sent to the Medical Superintendent within 14 days of the appearance of this advertisement.

HAREFIELD AND NORTHWOOD GROUP HOSPITAL MANAGEMENT COMMITTEE. ORTHOPÆDIC REGISTRAR required for this group of hospitals. Work involves sessions at Harefield, Mount Vernon, and Northwood, Pinner and District Hospitals, together with 3 sessions at St. Vincent's Orthopædic Hospital.

Application forms obtainable from the Group Secretary, Harefield and Northwood Group Hospital Management Committee, Mount Vernon Hospital, Northwood, Middlesex.

HASTINGS. ST. HELEN'S HOSPITAL (493 Beds). HOUSE SURGEON, resident, pre-registration post, vacant now.

Apply to Hospital Administrator.

HEMEL HEMPSTEAD, HERTFORDSHIRE. WEST HERTS HOSPITAL. HOUSE SURGEON (pre-registration) required. Post vacant 21st July, 1956.

Applications, giving full details and 2 names for reference, should be sent to the Hospital Secretary as soon as possible.

HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital situated 21 miles from London.) Applications are invited for appointment of HOUSE SURGEON—general, gynæcology and obstetrics (first or second post). Recognised under F.R.C.S. regulations, pre-registration post. Duties to commence as soon as possible.

Applications to Group Secretary, Hertford Hospital Management Committee, County Hospital, Hertford, Herts.

HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital situated 21 miles from London.) Applications are invited for the appointment of HOUSE SURGEON (general) (first, second, or third post). To commence 18th July, 1956. Pre-registration post; recognised under F.R.C.S. regulations.

Applications to Group Secretary, Hertford Group Hospital Management Committee, Hertford County Hospital, Hertford, Herts.

HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital situated 21 miles from London.) RESIDENT CASUALTY OFFICER (Senior House Officer grade) with attachment to Pædiatrician and Ophthalmic Consultant. Salary £745 p.a., less £130 p.a. residential emoluments. Recognised under F.R.C.S. regulations. Appointment to commence 25th June, 1956, or as soon as possible thereafter.

Apply, with full details and references, to Group Secretary, Hertford Hospital Management Committee, County Hospital, Hertford, Herts.

HUDDERSFIELD ROYAL INFIRMARY. (312 Beds.) 2 HOUSE SURGEONS required to commence duties early in July. The posts are recognised as pre-registration appointments and for the F.R.C.S. Salary in accordance with national scale.

Applications, together with copies of 3 recent testimonials, to be addressed to the undersigned as soon as possible.

H. J. JOHNSON, Secretary,
Huddersfield Hospital Management Committee.
The Royal Infirmary, Huddersfield.

HUNTINGDON COUNTY HOSPITAL. Applications are invited for the post of HOUSE OFFICER (surgical), now vacant. Post recognised for pre-registration purposes.

Apply, with full particulars and names of 2 referees, to Secretary, County Hospital, Huntingdon.

IPSWICH AND EAST SUFFOLK HOSPITAL, Anglesea ROAD WING. (356 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (Resident Anæsthetist). The post, which becomes vacant on 20th August, 1956, and is normally of 1 years duration, is recognised for the D.A. and the F.F.A.R.C.S. examinations.

Applications, stating age and nationality, together with recent testimonials, to Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL. Anglesea ROAD WING. (356 Beds.) Applications are invited for the post of HOUSE SURGEON to the Fracture and Orthopædic Department. Approved pre-registration post.

Applications, with copies of recent testimonials, to the Hospital Secretary.

ILFORD. KING GEORGE HOSPITAL. (General Hospital—211 Beds.) There will be a vacancy for a SENIOR HOUSE OFFICER, Orthopædic Department at above Hospital, on 27th July, 1956. Salary will be at the rate of £745 p.a., less emoluments. Recognised for F.R.C.S.

Applicants should have been registered not less than 1 year and should send applications, accompanied by copies of 3 testimonials, to the undersigned within 7 days of the appearance of this advertisement.

H. F. HARRIS, Group Secretary,
Ilford and Barking Group Hospital Management Committee.

ILFORD. KING GEORGE HOSPITAL, Eastern-avenue. There will be a vacancy for a HOUSE SURGEON, 15th July, 1956 (first or second post pre-registration), at above Hospital. The post will be tenable for 6 months.

Applications, giving full particulars and accompanied by testimonials, should be sent to the undersigned within 7 days of the appearance of this advertisement.

H. F. HARRIS, Group Secretary,
Ilford and Barking Group Hospital Management Committee.

ILKLEY. MIDDLETON HOSPITAL. (430 Beds.) Resident SENIOR HOUSE OFFICER (surgical) required for Major Thoracic Surgical Unit at the above Hospital.

Applications, stating age, nationality, qualifications and experience, to Hospital Secretary.

ISLEWORTH. WEST MIDDLESEX HOSPITAL. Applications are invited from registered dental practitioners for resident post of DENTAL HOUSE SURGEON for period 6 months, first, second, or third term appointment. Third term post candidates given preference. Hospital recognised for F.D.S. by Royal College of Surgeons of England. Terms and conditions of service of hospital medical and dental staff will apply.

Applications, stating age, qualifications with dates, details of experience, names and addresses of 3 referees, to Group Secretary, South West Middlesex Hospital Management Committee, West Middlesex Hospital, Isleworth, by 3rd July, 1956.

KETTERING AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the appointment of SENIOR HOUSE OFFICER in Anæsthetics, vacant 3rd July, 1956. Recognised for D.A.

Applications, giving details of qualifications and experience and enclosing copies of 3 recent testimonials, to be sent to the Group Secretary, General Hospital, Kettering, Northants.

LANCASTER. BEAUMONT HOSPITAL, Slyne-road. PÆDIATRIC REGISTRAR. Previous pædiatric experience essential. Duties include experience in Children s Medical Ward, in Neonatal Unit, and Pædiatric Outpatient Clinics. Unit recognised for D.C.H. Candidates may visit Hospital by direct appointment.

Applications, together with names of 2 referees, to Group Secretary, Royal Lancaster Infirmary, Lancaster.

LANCASTER. BEAUMONT HOSPITAL, Slyne-road. SENIOR HOUSE OFFICER (infectious diseases). Hospital recognised for D.C.H. and contains a Pædiatric Unit, Dermatological Unit, Infectious Diseases Department, and Pulmonary Tuberculosis Unit.

Applications, together with names of 2 referees, to Group Secretary, Royal Lancaster Infirmary, Lancaster.

LANCASTER MOOR HOSPITAL, Lancaster. (Regional MENTAL HOSPITAL.) Locum JUNIOR HOSPITAL MEDICAL OFFICER (Male or Female) required for minimum period of 3 months. Previous mental hospital experience preferred. Salary £17 10s. per week, less £140 p.a. for board and residence.

Apply Medical Superintendent.

LANCASTER. ROYAL LANCASTER INFIRMARY. (240 Beds.) RESIDENT HOUSE OFFICER (medical), pre-registration post. Duties include care of acute cases under the supervision of 2 Consultant Physicians and attendance at Consultative Clinics. Post vacant shortly ; tenable for 6 months.

Applications, with names of 2 referees, to Secretary (M), Royal Lancaster Infirmary, Lancaster.

LANCASTER. ROYAL LANCASTER INFIRMARY. (240 Beds.) RESIDENT HOUSE OFFICER (obstetrics and gynæcology), pre-registration post. Successful applicant will be attached to the specialist unit. Post vacant shortly, tenable for 6 months, and recognised for M.R.C.O.G. and D.Obst.R.C.O.G.

Applications, with names of 2 referees, to the Secretary (OG), Royal Lancaster Infirmary, Lancaster.

LANCASTER. ROYAL LANCASTER INFIRMARY. (240 Beds.) 2 RESIDENT HOUSE OFFICERS (surgical), pre-registration posts. Successful applicants will work with Consultant Surgical Unit and attend Consultative Clinics. Posts vacant shortly and tenable for 6 months. Recognised for F.R.C.S.

Applications, with names of 2 referees, to the Secretary (S), Royal Lancaster Infirmary, Lancaster.

LIVERPOOL. WALTON HOSPITAL. The following resident posts will become vacant on 1st September, 1956.

HOUSE PHYSICIAN (general medicine).
HOUSE SURGEONS (general surgery).
HOUSE SURGEON (Orthopædic Department).
HOUSE SURGEONS (gynæcology).

The above posts are recognised for Pre-registration Service.

SENIOR HOUSE OFFICER (orthopædics).
SENIOR HOUSE OFFICER (pathology).
SENIOR HOUSE OFFICER (chest diseases).

Applications, stating age, qualifications, experience, together with a copy of each of 2 recent testimonials, to Physician-Superintendent, Walton Hospital, Liverpool, 9.

LIVERPOOL, 15. SEFTON GENERAL HOSPITAL. (995 Beds, 116 Cots.) Applications are invited for the following resident appointments which will become vacant at the above-named Hospital on 1st September, 1956, and will be for a period of 6 months. These posts are approved as pre-registration posts.

6 HOUSE PHYSICIANS (general).
2 HOUSE PHYSICIANS (psychiatric).
3 HOUSE SURGEONS (general).
2 HOUSE SURGEONS (obstetric).
1 HOUSE PHYSICIAN (tropical).

The terms and conditions of service will be in accordance with the regulations of the Ministry of Health.

Application forms may be obtained from the undersigned to whom they should be returned not later than Tuesday, 3rd July, 1956. GARNET CHAPLIN, Secretary,
South Liverpool Hospital Management Committee.

LIVERPOOL, 15. SEFTON GENERAL HOSPITAL. (995 Beds.) Applications are invited from suitably qualified medical practitioners for the following appointments at the above Hospital which will become vacant on 1st September, 1956.

2 SENIOR HOUSE OFFICERS (medical).
2 SENIOR HOUSE OFFICERS (orthopædic).

The appointments will be for a period of 12 months. The salary will be at the rate of £745 p.a.

Application forms may be obtained from the undersigned to whom they should be returned not later than Monday, 16th July, 1956. GARNET CHAPLIN, Secretary to the Committee.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. Applications are invited for a resident post of SENIOR HOUSE OFFICER in Gynæcology at the Women's Hospital for the period 1st July (or as soon thereafter as possible) to 30th September, 1956.

Apply as soon as possible on form obtainable from the Secretary, 80, Rodney-street, Liverpool, 1.

LEEDS REGIONAL HOSPITAL BOARD. Registrar vacancies

Anæsthetics

Duties in the Leeds A and B Groups. Recognised for F.F.A.R.C.S. and D.A. Resident.

Obstetrics and Gynæcology

Halifax General Hospital with additional duties at Halifax Royal Infirmary (100 obstetric and 35 gynæcological beds). Recognised for M.R.C.O.G.

Psychiatry

Oulton Hall Hospital, near Wakefield, and affiliated mental deficiency colonies (aggregating 780 Beds). Non-resident. If desired facilities for attendance at the Leeds University will be provided if the successful candidate is studying for the D.P.M.

Applications, stating age, qualifications and details of present and previous appointments showing dates, together with the names and addresses of 3 referees, to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, by 5th July, 1956.

LEEDS. THE UNITED LEEDS HOSPITALS. The GENERAL INFIRMARY AT LEEDS. RESIDENT ORTHOPÆDIC OFFICER required of Senior House Officer status. The post will initially be for the period up to 31st October, renewable for a period of 6 months thereafter. Terms and conditions of service for hospital medical staff apply.

Applications, stating age, qualifications, previous posts with dates, to be sent to the Secretary to the Board by 26th June, 1956.

LEEDS. THE UNITED LEEDS HOSPITALS. The GENERAL INFIRMARY AT LEEDS. RESIDENT RADIOTHERAPY OFFICER (Senior House Officer status). Post vacant now and tenable in first instance for period up to 31st October. Renewable thereafter. The post affords facilities for training for D.M.R.T. Conditions of service for hospital medical staff apply.

Applications, stating age, qualifications, previous posts with dates, and 3 names for reference, should be sent to the Secretary to the Board as soon as possible.

AMENDED ADVERTISEMENT

LINCOLN. LAWN HOSPITAL, Union-road. (Mental Hospital for Private Patients—100 Beds.) LINCOLN NO. 2 HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER (full-time or Locum Tenens). Salary and conditions of service in accordance with latest recommendations of Whitley Council. A small flat is available.

Apply as early as possible to the Medical Superintendent.

LICHFIELD (near). ST. MATTHEW'S HOSPITAL, BURNTWOOD, LICHFIELD. (1350 mental beds.) BURTON-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER (psychiatry) required. Resident accommodation available. Facilities for a D.P.M. course at Birmingham University will be granted.

Applications, with names of 2 referees, to Medical Superintendent.

LOUTH, LINCOLNSHIRE. COUNTY INFIRMARY. (215 Beds.) GRIMSBY HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of Locum SENIOR HOUSE OFFICER (orthopædic and casualty), vacant 1st August, 1956, at this General Hospital.

Applications, giving full details, together with the names of 2 referees, should be addressed to the Hospital Secretary.

LUTON AND DUNSTABLE HOSPITAL, Luton, Bedfordshire. 2 HOUSE SURGEONS required for Accident Service, including Orthopædic Department. Vacant 1st July, 1956. Recognised as pre-registration posts and for F.R.C.S.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 recent testimonials, to the Secretary by 25th June.

LUTON AND DUNSTABLE HOSPITAL, Luton, Bedfordshire. 2 HOUSE SURGEONS required 1st July, 1956. Recognised as pre-registration posts and for the F.R.C.S.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 recent testimonials, to the Secretary by 25th June.

LUTON AND DUNSTABLE HOSPITAL, Luton. Locum ANÆSTHETIC REGISTRAR (resident) required now at this Hospital and associated units.

Applications, giving usual particulars, to Secretary, Luton and Hitchin Hospital Management Committee, St. Mary's Hospital, Luton, Beds, immediately.

MACCLESFIELD. PARKSIDE HOSPITAL MANAGEMENT COMMITTEE. (1656 Beds.) MANCHESTER REGIONAL HOSPITAL BOARD. Applications are invited for the post of RESIDENT REGISTRAR in Psychiatry. Facilities for attending the course for the D.P.M. at Manchester University will be granted and the Hospital is recognised by the Conjoint Board for the purpose of the D.P.M. Accommodation is available for a married or single person. The Hospital may be visited by appointment.

Applications, with the names of 2 referees, to be sent to the Medical Superintendent, Parkside Hospital, Macclesfield, Cheshire, to reach him by 7th July, 1956.

MACCLESFIELD HOSPITAL. (304 Beds.) Applications invited for CLINICAL PATHOLOGIST (resident or non-resident), Senior House Officer grade. Vacant 30th June. Post recognised for D.Path. equally suitable for those who later wish to do general medicine.

Apply, with names and addresses of 2 referees, to Group Secretary, Macclesfield and District Hospital Management Committee, "Willerby House," Cumberland-street, Macclesfield.

MORPETH, NORTHUMBERLAND. NORTHGATE AND DISTRICT HOSPITAL. JUNIOR HOSPITAL MEDICAL OFFICER required. The Hospital consists of 4 units with a total of 638 Beds for mental defectives of all ages and grades. A modern unfurnished flat is available at the Burnholme Unit, Stannington, at an inclusive rental of £3 12s. 1d. per month. Salary £775–£50–£1075 p.a.

Applications, stating age, qualifications, experience and names of 2 referees, to the Medical Superintendent within 14 days.

MANCHESTER (near). ALTRINCHAM GENERAL HOSPITAL AND ANNEXE (130 Beds). SENIOR HOUSE OFFICER (medical). This appointment, available early July, is in a busy hospital and offers excellent opportunities of practical experience.

Applications, together with 2 recent testimonials, to Group Secretary, North and Mid-Cheshire Hospital Management Committee, The Hospital, Sinderland-road, Altrincham, Cheshire.

MANCHESTER, 20. WITHINGTON HOSPITAL. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following pre-registration appointments, each for a period of 6 months, falling vacant in July/August, 1956.

4 HOUSE PHYSICIANS.
5 HOUSE SURGEONS.
1 HOUSE OFFICER (obstetrics).

The Hospital participates in the teaching of students in the Surgical and Obstetrical Departments and posts are recognised by the Royal Colleges. Whitley Council salaries and conditions.

Applications, stating age, qualifications, appointment(s) held and the names of 2 referees, should be sent to the Administrative Officer at the Hospital without delay.

MANCHESTER, 20. WITHINGTON HOSPITAL. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the post of SENIOR HOUSE OFFICER (medical) at Withington Hospital, vacant in July, 1956.

Details of previous experience and names of 2 referees should be forwarded immediately to the Group Secretary at the above address.

MANCHESTER, 20. WITHINGTON HOSPITAL. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (Paediatrics) in the Obstetric Unit at Withington Hospital (over 2000 cases annually) with some paediatric duties at other hospitals in the group.

Applications, stating age, nationality, experience, and the names of 2 referees, to the Group Secretary, Withington Hospital, Manchester, 20.

MANCHESTER. WEST MANCHESTER HOSPITAL. MANAGEMENT COMMITTEE. PARK HOSPITAL, DAVYHULME. (General Hospital—433 Beds.) SENIOR HOUSE OFFICER (anæsthetics) required. Post vacant early August. Hospital recognised for training for Diploma in Anæsthetics.

Forms from Secretary.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL EYE HOSPITAL. Applications are invited for the post of RESIDENT SURGICAL OFFICER (Registrar grade). Tenable for 12 months, subject to renewal. Previous experience in ophthalmology essential. The terms and conditions of service for hospital medical and dental staffs will apply.

Application forms may be obtained from the undersigned.

H. R. NORTH, General Superintendent.

MANCHESTER REGIONAL HOSPITAL BOARD. Senior REGISTRAR in Dermatology with main duties at the Manchester and Salford Hospital for Skin Diseases and occasional duties at peripheral clinics in the Manchester Regional Hospital Board area, as required.

Application forms obtainable from the Senior Administrative Medical Officer, Cheetwood-road, Manchester, 8, should be returned by 3rd July, 1956.

MANCHESTER REGIONAL HOSPITAL BOARD. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT REGISTRAR in Obstetrics and Gynæcology. The post is recognised for training for M.R.C.O.G. purposes. The main duties will be at Withington Hospital which takes part in undergraduate teaching. Applicants should have had previous experience in Obstetrics and Gynæcology.

Applications, stating age, experience and the names of 2 referees, to be forwarded to the Group Secretary, Withington Hospital, Manchester, 20, immediately.

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for the post of REGISTRAR in the Department of Thoracic Surgery at the Victoria Hospital, Blackpool (main centre), with additional duties at other hospitals in the North Lancashire area. The post offers excellent opportunities for gaining experience under 2 Consultant Thoracic Surgeons.

Applications, together with the names of 2 referees, or references, should be sent to the Group Secretary, Victoria Hospital, Blackpool.

MANCHESTER REGIONAL HOSPITAL BOARD. Salford HOSPITAL MANAGEMENT COMMITTEE. SALFORD ROYAL HOSPITAL. Applications invited for post of REGISTRAR (Urological Department). The post offers wide experience in all branches of urology.

Applications, with names and addresses of 2 referees, to Group Secretary, Salford Royal Hospital, Salford, 3, before 30th June, 1956.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (141 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the pre-registration post of HOUSE SURGEON. 6 months appointment. Post vacant 1st July, 1956. Salary at the rate of £425, £475 or £525 according to experience. A deduction at the rate of £125 a year is made for board and lodging and other services provided.

Applications should be forwarded as soon as possible to the Administrative Officer at the Hospital.

MARKET DRAYTON (near), SHROPSHIRE, CHESHIRE JOINT SANATORIUM. (305 Beds.) RESIDENT MEDICAL OFFICER (Junior Hospital Medical Officer or Senior House Officer according to experience). The post offers exceptional experience in the treatment of pulmonary tuberculosis.

Applications to the Medical Superintendent at the Sanatorium.

MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RESIDENT ANÆSTHETIST for joint duties at the West Kent General Hospital, and the Kent County Ophthalmic and Aural Hospital, Maidstone (total beds 254). The post, which is of Senior House Officer grade, is vacant now, and carries a salary of £745 a year, less £150 for residential emoluments. Excellent experience under Consultant Anæsthetists is available, and the post is recognised for the F.F.A.R.C.S. examination.

Applications, stating age, nationality, qualifications and experience, together with the names of 2 suitable referees, should be forwarded to the Administrative Officer, West Kent General Hospital, Maidstone.

NORWICH. NORFOLK AND NORWICH HOSPITAL. Applications are invited for the following appointments vacant 1st August, 1956. All are pre-registration posts and the salaries in each case are at the rate of £425, £475, or £525 p.a., according to experience, less £125 p.a. for residential emoluments :—

(1) Norfolk and Norwich Hospital, Norwich

HOUSE SURGEON (1), Male or Female. Post recognised for final F.R.C.S. examination requirements. Duties entirely general surgical.

JUNIOR CASUALTY OFFICER (Male or Female), 2 Casualty Officers employed in the Department.

(2) West Norwich and Norwich Isolation Hospitals

HOUSE PHYSICIANS (2), Male or Female. Duties include acute medical, geriatric, and infectious diseases. The beds at these units are under the control of the Consultant Physicians at the Norfolk and Norwich Hospital, and the successful candidate will be required to undertake general medical duties under their supervision.

(3) West Norwich Hospital, Norwich

HOUSE SURGEONS (2), Male or Female. Post recognised for final F.R.C.S. examination requirements. Duties general surgical and including burns and plastic work. The beds at this hospital are under the control of the Consultant Staff of the Norfolk and Norwich Hospital.

(4) Norfolk and Norwich Hospital, Norwich

Applications are also invited for the undermentioned appointment vacant 1st August, 1956 :—

ORTHOPÆDIC HOUSE SURGEON (Male or Female). House Officer or Senior House Officer status. Salary £745 p.a. if Senior House Officer, less £150 for full residential emoluments.

Membership of a Medical Defence Society is a condition of appointment in each case.

Applications for the above posts stating age, qualifications and experience, with names of 2 referees, to be sent to Group Secretary, No. 6 Group Hospital Management Committee, St. Stephen's-road, Norwich.

NEWCASTLE REGIONAL HOSPITAL BOARD. Sunderland AREA HOSPITAL MANAGEMENT COMMITTEE. REGISTRAR PHYSICIAN, whole-time, for Medical Clinic No. 2 at General Hospital, Sunderland, 39 medical beds, large up-to-date Outpatient Department and chest screening unit. Single accommodation available.

Applications, with names and addresses of 3 referees, to be forwarded to Senior Administrative Medical Officer, Newcastle Regional Hospital Board, Walker Gate Hospital, Benfield-road, Newcastle upon Tyne, 6, within 14 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. Regional BLOOD TRANSFUSION SERVICE. MEDICAL OFFICER (Junior Hospital Medical Officer grade), whole-time for a period not exceeding 4 years. Experience in serology preferable, but not essential. Duties in the laboratory and in blood collection.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Walker Gate Hospital, Benfield-road, Newcastle upon Tyne, 6, within 14 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. Cleveland HOSPITAL MANAGEMENT COMMITTEE. REGISTRAR PÆDIATRICIAN (whole-time), Children's Hospital, Stockton-on-Tees (84 Beds). Well-furnished married accommodation available.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Walker Gate Hospital, Benfield-road, Newcastle upon Tyne, 6, within 14 days.

NEWCASTLE UPON TYNE HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER in Ophthalmology to undertake duties at Inpatient Unit (44 Beds), Walker Gate Hospital; Children's Unit (21 Beds), Walker Accident Hospital; and Outpatient Department, Newcastle General Hospital. Applications are invited from registered medical practitioners for the above post (preferably resident, single accommodation available Walker Gate Hospital). The Units are recognised for the Diploma of Ophthalmology. Salary in accordance with the terms and conditions of service of hospital medical and dental staff.

Applications, together with the names and addresses of 3 referees, to be sent as soon as possible to the Hospital Secretary, Walker Gate Hospital, Benfield-road, Newcastle upon Tyne, 6.

NEWCASTLE. THE UNITED NEWCASTLE UPON TYNE HOSPITALS. Applications are invited for the whole-time appointment of REGISTRAR in the Department of Anæsthetics at the Royal Victoria Infirmary, which is associated with the Medical School of the University of Durham. The post, which is non-resident except for rotational emergency duty, will be for 1 year in the first instance and is subject to terms and conditions of service of hospital medical staff in the National Health Service. It offers the opportunity for study for the F.F.A.R.C.S. examination. Applicants should have held postgraduate appointments in medicine and surgery and should have had some experience in anæsthetics.

Applications, giving full details and the names and addresses of 3 referees, should be sent to the undersigned within 2 weeks of the appearance of this advertisement.

A. W. SANDERSON, House Governor and Secretary.
Royal Victoria Infirmary, Newcastle upon Tyne.

NEWTON ABBOT HOSPITAL. Locum Senior House OFFICER (medicine), required from 1st to 31st July, 1956, for above Hospital. Duties divided equally between 20 acute medical beds and 140 geriatric beds. Also required to stand in when Senior House Surgeon otherwise engaged. Married quarters available.

Applications, with copy testimonials, to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, S. Devon.

NEWTON ABBOT HOSPITAL. (General Section—65 Beds.) RESIDENT SENIOR HOUSE SURGEON (Male or Female) required immediately. Married quarters available.

Applications (quoting ref. F.364/35), stating qualifications, nationality, age, with copy testimonials, to be sent to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, S. Devon.

NEWMARKET GENERAL HOSPITAL, Suffolk. Applications are invited for the post of HOUSE SURGEON, now vacant. Duties include surgical House charge of general surgical E.N.T. and eye cases. Post resident and available for 6 months, recognised for pre-registration.

Applications, with copies of 3 testimonials, to the Medical Superintendent.

NOTTINGHAM CHILDREN'S AND CITY HOSPITALS. SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (pædiatrics) required. Post vacant 18th August. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 2nd July, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

NOTTINGHAM CHILDREN'S HOSPITAL. (136 Beds. Recognised for the D.C.H.) Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER (surgical), which will be vacant mid-July. The post is tenable for 6 months or a year by agreement.

Applications, with copies of 2 testimonials, should be sent to the Secretary, Nottingham Children s Hospital, Chestnut-grove, Nottingham.

NOTTINGHAM GENERAL HOSPITAL. Resident pre-registration or registered HOUSE SURGEONS required. Duties to commence 1st August.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to Group Secretary.

NOTTINGHAM. HIGHBURY HOSPITAL. Senior MEDICAL HOUSE OFFICER required at the above Hospital. Resident. Duties to commence on or about 17th July, 1956. The successful candidate will, in addition to medical duties, have an opportunity of assisting in the Obstetric Unit. This post will be accepted as a general medical appointment entry to the M.R.C.O.G. examination.

Apply in writing, stating age, qualifications and experience, together with copies of testimonials, to the Group Secretary, General Hospital, Nottingham.

PETERBOROUGH. MEMORIAL HOSPITAL. Peter-BOROUGH AND STAMFORD HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the position of HOUSE PHYSICIAN, which will become vacant on 24th July, 1956. The appointment will be for 6 months.

Applications, with testimonials, should be addressed to the Secretary, Memorial Hospital, Peterborough.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL GENERAL HOSPITAL GROUP. AREA PATHOLOGICAL DEPARTMENT. Applications invited from duly qualified and registered medical practitioners for the appointment of RESIDENT SENIOR HOUSE OFFICER in Pathology, vacant 1st July, 1956. The appointment will be for a period of 12 months, in the Area Laboratory at the South Devon and East Cornwall Hospital, Greenbank-road, Plymouth, which provides excellent modern working facilities.

Applications, stating age, nationality, qualifications and experience, together with the names and addresses of 3 referees, to be sent to ARTHUR R. CASH, Group Secretary.

7, Nelson-gardens, Stoke, Plymouth.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL. CENTRAL CASUALTY DEPARTMENT. SENIOR HOUSE OFFICER in Casualty, vacant immediately. Recognised for the F.R.C.S.

Applications, stating age, nationality, qualifications and experience, with names of 3 referees, to be sent to—

ARTHUR R. CASH, Group Secretary, Plymouth,
South Devon and East Cornwall General Hospital Group.
7, Nelson-gardens, Stoke, Plymouth.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL.

SENIOR HOUSE OFFICERS in Anæsthetics, vacancies 1st September, 1st October, 1956. Recognised for the D.A. and F.F.A.R.C.S. The appointments will be for a period of 12 months. South Devon and East Cornwall Hospital, Plymouth.

HOUSE SURGEONS (pre-registration posts), vacancies June and 1st July, 1956. Recognised for the F.R.C.S. Greenbank Road Section.

Applications, stating age, nationality, qualifications and experience, with names of 3 referees, to be sent to—

ARTHUR R. CASH, Group Secretary, Plymouth,
South Devon and East Cornwall General Hospital Group.
7, Nelson-gardens, Stoke, Plymouth.

OXFORD. LITTLEMORE (MENTAL) HOSPITAL AND ASHHURST CLINIC. Applications invited for the post of SENIOR HOUSE OFFICER. Previous experience as House Surgeon or Physician essential. Previous psychiatric experience unnecessary. The Physician appointed will work primarily in the Insulin Therapy Clinic and with a Senior Consultant at Outpatient Clinics. There are ample facilities for postgraduate study in a teaching general hospital. Salary £745 p.a.

Apply Physician-Superintendent.

PONTYPRIDD AND RHONDDA HOSPITAL MANAGE-MENT COMMITTEE.

East Glamorgan Hospital, Church Village, near Pontypridd (316 Beds and large Outpatient Department. Committee's Base Hospital serving population of 174,000. Recognised for M.R.C.O.G., D.Obst.R.C.O.G., F.R.C.S., D.C.H., F.F.A.R.C.S., D.A.)

SENIOR HOUSE OFFICER (surgical), to commence 24th July, 1956.
SENIOR HOUSE OFFICER (anæsthetics), to commence 29th August, 1956.
SENIOR HOUSE OFFICERS (medical), to commence 1st August, 1956, to include duties at Llwynypia Hospital.
SENIOR HOUSE OFFICER (pædiatrics), to commence 1st August, 1956.
2 HOUSE OFFICERS (medical), to commence 1st August, 1956.
HOUSE OFFICER (pædiatrics), to commence 1st August, 1956.
4 HOUSE OFFICERS (surgical), to commence 1st August 1956, to include duties at Porth and District Hospital.
2 HOUSE OFFICERS (obstetrics), to commence 1st August, 1956.

Llwynypia Hospital, Llwynypia, Rhondda (50 acute medical beds ; geriatric beds ; serving area population of 112,000)

SENIOR HOUSE OFFICER (medical), to commence 1st August, 1956.

Person appointed will have part responsibility for the Group Infectious Diseases Hospital.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, to be sent to the Group Secretary, Courthouse-street, Pontypridd.

POOLE GENERAL HOSPITAL, Poole, Dorset. Bourne-MOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of HOUSE PHYSICIAN (pre-registration intern) for post becoming vacant on 9th July, 1956.

Applications to the Hospital Secretary.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE.

Saint Mary's Hospital

SENIOR HOUSE OFFICER (gynæcology) required. The department consists of 50 Beds and offers excellent facilities for training. Recognised for M.R.C.O.G. Vacant now.

Queen Alexandra Hospital

SENIOR HOUSE OFFICER for Gynæcological Department (39 Beds), vacant now. Recognised for M.R.C.O.G.

Royal Portsmouth Hospital (Orthopædic Department—104 Beds)

HOUSE OFFICER (pre-registration), vacant now.

Royal Portsmouth Hospital

HOUSE OFFICER for pædiatric and medical beds (30 Beds). Pre-registration post, vacant 16th July.

Queen Alexandra Hospital (78 medical beds)

HOUSE PHYSICIAN (pre-registration), vacant 30th July.

Saint Mary's Hospital (74 medical beds)

HOUSE PHYSICIANS (pre-registration), vacant 30th July (1), and 31st July (2).

Saint Mary's Hospital (130 surgical beds)

HOUSE SURGEONS (pre-registration). Posts vacant 23rd, 29th and 30th July.

Applications, stating age, experience, and qualifications, together with names of 2 referees, should be forwarded as soon as possible to E. H. HURST.

35, Grove-road South, Southsea.

READING. ROYAL BERKSHIRE HOSPITAL. (399 Beds.) Applications are invited from registered medical practitioners (Male or Female) for the appointment of a SENIOR HOUSE OFFICER (anæsthetics), vacant 1st August next for a period of 1 year. Post recognised for F.F.A.R.C.S. Salary £745 p.a., less £125 for board-residence.

Write, stating age, qualifications with dates, nationality and present post together with the names of 2 referees, to the Group Secretary, Reading and District Hospital Management Committee, 3, Craven-road, Reading.

READING AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER for E.N.T. Department, Royal Berkshire Hospital, Reading (40 Beds). Post recognised for D.L.O.

Applications, stating age, nationality, experience and qualifications, together with names of 2 referees, should be sent to Group Secretary, 3, Craven-road, Reading.

READING. BATTLE HOSPITAL. (391 Beds.) Applications are invited from registered medical practitioners for post of RESIDENT JUNIOR HOUSE SURGEON in the Area Accident and Orthopædic Department, vacant 1st August, 1956. F.R.C.S. recognised. Also casualty duties. Salary £425–£525 p.a., less £125 board-residence.

Apply, stating age, qualifications with dates, nationality, present post with 1 copy of recent testimonial, to Hospital Secretary.

REDHILL COUNTY HOSPITAL. (552 Beds.) Medical REGISTRAR required for 1 year in first instance, renewable for second year, vacant 1st October. Residential accommodation available. Visits by arrangement with Physician-Superintendent.

Application forms from Group Secretary, Redhill Hospital Management Committee, Earlswood Mount, Pendleton-road, Redhill, Surrey.

ROCHDALE AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. HOUSE OFFICER (surgery), post available at Birch Hill Hospital mid-July. Recognised 6 months F.R.C.S. experience. Pre-registration candidates eligible.

Apply at once to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) RESIDENT HOUSE PHYSICIANS (2) required from 25th July and 1st September, 1956. Open to either pre-registration applicants or to fully qualified practitioners.

Apply to Group Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, by 7th July, 1956.

ROTHERHAM HOSPITAL, Doncaster Gate, Rotherham. (161 Beds. Recognised for the F.R.C.S.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT SURGICAL REGISTRAR required. Post vacant 1st September. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 2nd July, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

RYDE. ROYAL I.W. COUNTY HOSPITAL. Isle of Wight GROUP HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (salary £745) or HOUSE OFFICER for Pre-registration Service (salary £425–£525 according to experience) required as House Surgeon. Post recognised for F.R.C.S.

Applications, with name of 2 referees, to Hospital Secretary, not later than 30th June, 1956.

SALISBURY GENERAL HOSPITAL. South West Metropolitan REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of REGISTRAR to the Orthopædic Department at above Hospital with effect from 1st October.

Application forms may be obtained from, and must be returned to, Group Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury, by 5th July.

SHEFFIELD NATIONAL CENTRE FOR RADIOTHERAPY. SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time NON-RESIDENT SENIOR HOUSE OFFICER or REGISTRAR in Radiotherapy required. (Possession of D.M.R.(T) Part I necessary to qualify for appointment as Registrar.) Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 2nd July, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

SHEFFIELD REGIONAL HOSPITAL BOARD. Sheffield NATIONAL CENTRE FOR RADIOTHERAPY. Whole-time NON-RESIDENT SENIOR REGISTRAR required. Candidates should possess the Diploma in Radiotherapy or a higher qualification in Medicine or Surgery. Duties mainly in Sheffield but there may be occasional duties at associated Centres in the Region. Appointment for 1 year in first instance, reviewable annually.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 9th July, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. Applications invited for the following posts :—

(*a*) NON-RESIDENT REGISTRAR or SENIOR HOUSE OFFICER in Clinical Pathology. Grade according to qualifications and experience.

Applications to be sent immediately.

(*b*) REGISTRAR in General Medicine at the Royal Hospital Unit. Post vacant 1st August, 1956.

Closing date for applications 30th June, 1956.

Applications, with the names of 3 referees, should be sent to the Chief Administrative Officer, The United Sheffield Hospitals, West-street, Sheffield. 1.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. SENIOR HOUSE OFFICER in Dermatology required at the Royal Infirmary Unit.

Applications, with the names of 3 referees, to be sent at once to The Superintendent, Royal Infirmary, Sheffield, 6.

SHOTLEY BRIDGE GENERAL HOSPITAL, Shotley BRIDGE, CO. DURHAM. (557 Beds.) Applications are invited for the resident posts of 2 HOUSE PHYSICIANS which are recognised for pre-registration purposes. Salary £425–£525 p.a. according to experience. Deduction of £125 p.a. for board, lodging, &c. 6 months appointment.

Applications, stating age, qualifications, experience and enclosing copies of 2 recent testimonials, to the Group Secretary, North West Durham Hospital Management Committee.

SHOTLEY BRIDGE GENERAL HOSPITAL, Shotley BRIDGE, CONSETT, CO. DURHAM. RESIDENT HOUSE OFFICER required for 6 months for duties in Obstetrical (30 Beds) and Gynæcological (43 Beds) Departments. Resident at Richard Murray Maternity Hospital. Recognised for D.Obst.R.C.O.G. Second pre-registration or post-registration appointment.

Apply to the Group Secretary, North West Durham Hospital Management Committee, stating age and experience, and enclosing copies of 3 recent testimonials.

SHOTLEY BRIDGE GENERAL HOSPITAL, Shotley BRIDGE, CO. DURHAM. (557 Beds.) Applications are invited for the resident posts of 2 HOUSE SURGEONS which are recognised for pre-registration purposes. Salary £425–£525 p.a., according to experience. Deduction of £125 p.a. for board, lodging, &c. 6 months appointment. Posts recognised for F.R.C.S.

Applications, stating age, qualifications, experience, and enclosing copies of 2 recent testimonials, to the Group Secretary, North West Durham Hospital Management Committee.

SHREWSBURY. ROYAL SALOP INFIRMARY/COPTHORNE HOSPITAL. (500 Beds.) HOUSE SURGEONS (2), vacant 12th July, 1956. Pre-registration candidates eligible. Recognised for the F.R.C.S.

Applications, with copy testimonials, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the following appointments, which will be for 1 year in the first instance :—

SENIOR REGISTRAR in Surgery, based in the first instance at the Royal Alexandra Infirmary, Paisley.

REGISTRAR in General Surgery and Orthopædics based at the Royal Infirmary, Dumfries.

REGISTRAR in Surgery for duties in the Neurosurgical Unit, Killearn Hospital, near Glasgow.

REGISTRAR in Psychiatry based at Riccartsbar Mental Hospital, Paisley.

REGISTRAR in Obstetrics and Gynæcology based at Braehoim Maternity Hospital, Helensburgh.

REGISTRAR in Pædiatrics based at Seafield Children's Hospital, Ayr, and with duties at the Ayrshire Maternity Hospital.

REGISTRAR in Pathology and Bacteriology based at the Western Infirmary, Glasgow.

These appointments are subject to the National Health Service (Scotland) superannuation regulations.

Applications (12 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, C.2, by 7th July, 1956.

SCOTLAND. EASTERN REGIONAL HOSPITAL BOARD. Tuberculosis. DUNDEE AREA. Applications are invited for the appointment of REGISTRAR in Tuberculosis at Ashludie Hospital, Monifieth, near Dundee (222 Beds, including the Regional Thoracic Surgical Unit of 66 Beds). Salary and conditions of service in accordance with national agreement.

Further particulars and forms of application from the Secretary to the Board, "Braeknowe," 430, Blackness-road, Dundee, with whom applications must be lodged not later than 30th June, 1956.

SCOTLAND. EASTERN REGIONAL HOSPITAL BOARD. PERTH ROYAL INFIRMARY. Applications are invited for the appointment of REGISTRAR in Medicine at Perth Royal Infirmary (272 Beds). Salary and conditions of service in accordance with national agreement.

Further particulars and forms of application from the Secretary to the Board, "Braeknowe," 430, Blackness-road, Dundee, with whom applications must be lodged not later than 30th June, 1956.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of a REGISTRAR in Orthopædic Surgery to the West Fife Group of hospitals, based on the Dunfermline and West Fife Hospital.

Applications, giving particulars of age, qualifications, and previous experience, together with the names of 2 referees, should be sent to the Secretary, South-Eastern Regional Hospital Board, Scotland, 11, Drumsheugh-gardens, Edinburgh, 3, by 14th July, 1956.

SIDCUP AND SWANLEY HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER (general surgery and gynæcology). The post is recognised by the R.C.S. of England under the regulations for the Fellowship and gives excellent experience of emergencies with a rapid turnover.

Applications, stating age, qualifications and experience, should be addressed to the Secretary at Queen Mary's Hospital, Sidcup, Kent.

SKIPTON (near). GRASSINGTON HOSPITAL. (208 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER required for the above Hospital, which provides treatment for tuberculosis patients, men and women. Accommodation available for single applicants. Post tenable from 1st September, 1956.

Applications to Medical Superintendent.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. WINDSOR GROUP HOSPITAL MANAGEMENT COMMITTEE. CASUALTY HOUSE OFFICER required, 1 of 2, for busy department. Experience provided in orthopædic and plastic cases. Salary on House Officer scale plus £50 p.a.

Applications, with names of 2 referees to Secretary.

STAFFORD. STAFFORDSHIRE GENERAL INFIRMARY. (175 Beds—Recovery Unit 32 Beds.) HOUSE SURGEON (pre-registration post), vacant 10th July, 1956. At end of term of service the successful applicant will be considered for appointment to a pre-registration post of House Physician if he or she has not held such an appointment.

Applications to Group Secretary, Stafford Hospital Management Committee, 13, Foregate-street, Stafford.

SOUTHAMPTON GENERAL HOSPITAL. (471 Beds. Recognised for F.R.C.S.) RESIDENT HOUSE SURGEON required immediately. Pre-registration candidates eligible.

Applications, with copies of recent testimonials, should be forwarded to Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHEND GENERAL HOSPITAL. Applications are invited for appointment as HOUSE PHYSICIAN (pre-registration). Post vacant 31st July, 1956. Salary according to previous appointments held, less the prescribed charge for residential emoluments.

Applications, stating age, qualifications and previous experience, with copies of recent testimonials (1 testimonial sufficient from applicants for first appointment) to reach the undersigned by 28th June, 1956. J. C. FIELD, Secretary.

SOUTHPORT GENERAL INFIRMARY. (Recognised for F.R.C.S. and pre-registration.) HOUSE SURGEON (general surgery and ophthalmology). Post vacant July.

Apply, stating age, nationality, qualifications, experience and names of 2 referees, to Group Secretary, Southport and District Hospital Management Committee, Promenade Hospital, Southport.

SOUTHPORT GENERAL INFIRMARY. Junior Hospital MEDICAL OFFICER (resident). Whole-time casualty post, vacant early August.

Apply, stating age, nationality, qualifications, experience and copies of 2 recent testimonials, to Group Secretary, Southport and District Hospital Management Committee, Promenade Hospital, Southport.

ST. HELENS AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. ECCLESTON HALL HOSPITAL. (75 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER at the above Hospital. The person appointed will work under the supervision of the Consultant Chest Physician for the Group. There are 75 Beds and the work comprises all types of tuberculosis. Good residential accommodation for a single person, Male or Female, is available.

Applications to be forwarded to N. RICHARDS, Group Secretary, Whiston Hospital, Prescot.

ST. HELENS AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. WHISTON HOSPITAL, PRESCOT. (892 Beds.) Applications are invited for the resident post of SENIOR HOUSE OFFICER (obstetrics and gynæcology) which is recognised for the M.R.C.O.G. and D.Obst.R.C.O.G. examinations.

Applications, stating age, qualifications, and experience, and giving 2 names for reference, should be forwarded to N. RICHARDS Group Secretary, Whiston Hospital, Prescot.

STOCKPORT INFIRMARY. (163 Beds.) **Applications** are invited for the post of HOUSE OFFICER or SENIOR HOUSE OFFICER (medicine), vacant 1st July.

Applications, stating age, experience, and qualifications together with copies of 2 testimonials, to be addressed to the Group Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw-heath, Stockport.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. HOUSE OFFICER (general surgery), vacant now. Pre-registration post. Hospital recognised for F.R.C.S.

Detailed applications, with copy testimonials, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. Applications invited for HOUSE OFFICER (medical), vacant 18th July. Recognised pre-registration post.

Detailed applications to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. HOUSE OFFICER (general surgery) required. Pre-registration post. Hospital recognised for F.R.C.S.

Detailed applications, with copy testimonials, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. SENIOR HOUSE OFFICER (E.N.T.) required, vacant now. Recognised F.R.C.S. and D.L.O.

Detailed applications, with copy testimonials, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. HOUSE PHYSICIAN (general medicine) with dermatology. Pre-registration post.

Detailed applications, with copy testimonials, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STRATFORD-ON-AVON GENERAL HOSPITAL. (163 Beds.) SENIOR HOUSE OFFICER (Resident Medical Officer) required. Post vacant 14th July. Duties on medical wards under supervision of consultant staff. Appointment gives good experience in general medicine and is suitable for one working for a higher qualification. 2 other resident staff.

Applications, giving qualifications and experience, together with copies of 2 testimonials, to Hospital Secretary.

SWANSEA HOSPITAL, Swansea. (403 Beds.) **Glantawe** HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the non-resident appointment of CASUALTY OFFICER of Junior Hospital Medical Officer grade at the above Hospital.

Full particulars, stating age, qualifications and experience, should be forwarded immediately to the Hospital Secretary.

TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL. HOUSE SURGEON required for post vacant 25th July. Preference given to persons seeking pre-registration post.

Applications, stating age, qualifications with dates, with copies of 2 recent testimonials, to Secretary.

TAUNTON AND SOMERSET HOSPITAL. Applications are invited for SENIOR HOUSE OFFICER (Resident Surgical Officer). Post vacant from 11th July, 1956. This is a post giving excellent experience in surgery, including operating work according to qualifications and experience. The post is recognised by the Royal College of Surgeons as a qualifying appointment for the final Fellowship examination.

Applications, stating age, nationality and qualifications, together with the names of 2 referees, should be forwarded to the Group Secretary, Taunton Hospital Management Committee, Taunton and Somerset Hospital, Musgrove Park Branch, Taunton, Somerset.

TORQUAY. TORBAY HOSPITAL. (166 general beds.) RESIDENT HOUSE OFFICER (surgical), Male or Female, required middle June. Post recognised for F.R.C.S. and pre-registration purposes. There is a complement of 5 Resident House Officers.

Applications, stating qualifications, nationality, and age together with copy testimonials (quoting reference F.955/70), to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, S. Devon.

TREDEGAR GENERAL HOSPITAL (20 miles from Newport, Mon., and 24 from Teaching Hospital at Cardiff; 6 miles from the Vale of Usk). HOUSE SURGEON required at above Hospital. Surgical unit of 50 Beds with also 6 orthopædic beds under daily supervision of Consultant Surgeons and visiting supervision of Orthopædic Surgeon. Busy Outpatient, Casualty and Radiology Departments. Married quarters available. Pre-registration if suitable candidate available.

Apply, with full particulars, to Group Secretary, Rhymney and Sirhowy Valleys Hospital Management Committee, Central Offices, Caerphilly-road, Ystrad Mynach, Hengoed, Glam., by 11th July.

WAKEFIELD. THE GENERAL HOSPITAL, Park Lodge-lane. (158 Beds.) RESIDENT SURGICAL OFFICER (Senior House Officer grade) required at the above Hospital. Post vacant immediately Salary and conditions of service in accordance with national recommendations.

Application should be made to the Group Secretary, Hospital Management Committee No. 9, Wakefield A Group, 113, Northgate, Wakefield.

WARRINGTON INFIRMARY. (172 Beds.) **Applications** are invited for the vacant post of RESIDENT ANÆSTHETIST (Male or Female). Graded as Senior House Officer. The Hospital is recognised for the D.A. examination. Salary is £745 p.a., less a deduction of £130 p.a. for residential emoluments.

Applications, stating qualifications and experience, should be sent to— H. L. BOOT, Group Secretary,

Warrington and District Hospital Management Committee.
c/o General Hospital, Warrington, Lancs.

WARRINGTON INFIRMARY. (172 Beds.) **Applications** are invited for the post of RESIDENT CASUALTY OFFICER (Male or Female), now vacant. The post is graded Junior Hospital Medical Officer. Scale of salary £775–£50–£1075, less a deduction of £130 for residential emoluments. Applications will also be considered from Junior Medical Officers who would be graded House Officer or Senior House Officer at the scale appropriate to the experience of the applicant. Consideration will also be given to applicants who desire the appointment on a short-term basis. A whole-time Senior Hospital Medical Officer is in charge of the Department.

Applications, stating age, experience and qualifications should be forwarded or telephoned to—

H. L. BOOT, Group Secretary,
Warrington and District Hospital Management Committee.
c/o General Hospital, Warrington, Lancs.
(Tel. No. Warrington 1666.)

WATFORD, HERTFORDSHIRE. PEACE MEMORIAL HOSPITAL. (208 Beds.) Applications are invited for the post of HOUSE SURGEON at the above Hospital. This is a pre-registration post and is recognised for F.R.C.S. Salary according to the National Health Service scale.

Applications, with copies of recent testimonials, to the Administrator.

WELSH REGIONAL HOSPITAL BOARD.

REGISTRAR in Thoracic Medicine, to serve Clwyd and Deeside Hospital Management Committee. Based at Abergele Chest Hospital, North Wales (248 Beds). Children (pulmonary and non-pulmonary), adults (pulmonary). Hospital has major Thoracic Unit. Resident.

REGISTRAR (general surgery), St. Woolos Hospital, Newport, Mon (379 Beds). Post covers 56 Beds, recognised F.R.C.S. 6 months. Non-resident.

REGISTRAR in Anæsthetics to serve Pontypridd and Rhondda Hospital Management Committee area. Based at East Glamorgan Hospital, Church Village, near Pontypridd, may also be expected to serve other hospitals within group. Resident/non-resident.

Subject to review end of first year.

Application forms from Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 14 days.

WESTCLIFF HOSPITAL, Balmoral-road, Westcliff-on-sea, ESSEX. Applications are invited for the post of RESIDENT MEDICAL OFFICER (Senior House Officer grade). Post now vacant. The Hospital deals with communicable diseases and general medicine. The appointment covers a wide field of medicine and offers excellent training for general practice.

Applications should be sent to the Secretary, General Hospital, Prittlewell-chase, Southend-on-Sea, Essex, as soon as possible.

WESTON-SUPER-MARE GENERAL HOSPITAL. (107 Beds.) Applications are invited from registered medical practitioners for the pre-registration appointment (resident), vacant 1st August, 1956, of HOUSE SURGEON.

Applications, stating age, qualifications, together with names and addresses of 2 referees, should be addressed to the Secretary, Weston-super-Mare Hospital Management Committee.

WIGAN AND LEIGH HOSPITAL MANAGEMENT COMMITTEE.

Royal Albert Edward Infirmary, Wigan

3 HOUSE SURGEONS (pre-registration posts). First vacant 17th July (casualty duties). Second and third vacant 17th and 31st July (general duties).

Leigh Infirmary

HOUSE SURGEON (pre-registration post), vacant 29th July.

Applications, with names of 2 referees, to the Secretary, Knowsley House, Wigan.

WIGAN AND LEIGH HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER in General Surgery required for duty at Billinge Hospital, Orrell, near Wigan (370 Beds). Post vacant 1st July.

Applications, with names of 2 referees, to Secretary, Knowsley House, Wigan.

WILLERBY, EAST YORKSHIRE (near Hull). DE LA POLE HOSPITAL. (1174 Beds—mental illness and nervous disorders.) JUNIOR HOSPITAL MEDICAL OFFICER. Hospital has admission-rate of over 850 annually. Modern reception hospital, villas and neurosis unit. All modern methods of treatment practised. The successful candidate will be engaged on work in the admission wards to a considerable extent and for duties at a Psychiatric Day Clinic to be opened shortly. Accepted for D.P.M. training. Residential.

Application forms from Group Secretary, Hull B Hospital Management Committee, at the above address.

WINCHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR to Department of Physical Medicine, to work at main hospital(s) and in peripheral departments. Non-resident. Work includes all branches of physical medicine and the post is recognised by Examining Board in England for Part II of the D.Phys.Med.

Application forms obtainable from Group Secretary, Royal Hampshire County Hospital, Winchester, to be completed and returned within 14 days of appearance of this advertisement.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOSPITAL. (313 Beds.) CASUALTY OFFICER (Senior House Officer grade), vacant 11th August. Post recognised for the F.R.C.S. The appointment will be for 6 months in the first instance.

Applications, with copies of 2 testimonials, to the Group Secretary.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOSPITAL. (313 Beds.) HOUSE SURGEON (post recognised by Royal College of Surgeons) required for general surgery with some E.N.T. duties. Approved pre-registration post. Vacant 27th August.

Applications, with copies of 2 testimonials, to the Group Secretary.

WINDSOR. KING EDWARD VII HOSPITAL. House SURGEON in General Surgery required, Male or Female, for post vacant 1st August. Recognised for F.R.C.S. Preference given to persons seeking pre-registration post. Applicants required to be members of a Medical Protection Society.

Applications, stating age, nationality, qualifications with dates, with copies of recent testimonials, to Secretary.

WOLVERHAMPTON GROUP. Royal Hospital. Junior PATHOLOGIST required. Salary in Junior Hospital Medical Officer grade. Comprehensive service offering wide experience and training. Resident post vacant shortly. Candidates may visit Pathologist.

Applications to Group Secretary, The Royal Hospital, Wolverhampton.

WOLVERHAMPTON GROUP.

The Royal Hospital, Wolverhampton (an Associated Hospital of the University of Birmingham Medical School)

1 HOUSE OFFICER (pædiatric), vacant 16th July. Appointment recognised for D.C.H.

3 HOUSE OFFICERS (general surgery), vacant mid-July.

1 HOUSE OFFICER (Locum general surgery). From 25th June for approximately 3 weeks.

Also listed as pre-registration posts.

SENIOR HOUSE OFFICER (Anæsthetist), vacant now. Appointment recognised for D.A. and F.F.A.R.C.S.

Apply Secretary, with copies of testimonials.

WREXHAM. MAELOR GENERAL HOSPITAL. (591 Beds.) Applications are invited for the post of HOUSE SURGEON at the above Hospital, to commence duties on 28th June, 1956. The appointment is recognised for the Diploma of F.R.C.S. (Eng. and Edin.) and is a pre-registration post.

Applications, stating age, nationality, qualifications and experience, with copies of 2 recent testimonials, to be sent to the Group Secretary, Maelor General Hospital, Wrexham, as soon as possible.

WREXHAM. MAELOR GENERAL HOSPITAL. (591 Beds.) Applications are invited for the post of PÆDIATRIC HOUSE PHYSICIAN at the above Hospital, to commence 1st August, 1956. The appointment is recognised for the D.C.H. and for pre-registration purposes.

Applications, stating age, nationality, qualifications and experience, together with copies of 2 recent testimonials, to the Group Secretary, Wrexham, Powys and Mawddach Hospital Management Committee, Maelor General Hospital, Wrexham, as soon as possible.

WREXHAM. WAR MEMORIAL HOSPITAL. (230 Beds.) Applications are invited for the post of HOUSE SURGEON at the above Hospital, to commence duties on 1st August, 1956. The appointment is recognised for the Diploma of F.R.C.S. (Eng. and Edin.) and is a pre-registration post.

Applications, stating age, nationality, qualifications and experience, with copies of 2 recent testimonials, to be sent to the Group Secretary, Maelor General Hospital, Wrexham, as soon as possible.

WREXHAM. WAR MEMORIAL HOSPITAL. (230 Beds.) Applications are invited for the post of HOUSE PHYSICIAN at the above Hospital, to commence 1st August, 1956. The appointment is recognised for pre-registration purposes.

Applications, stating age, nationality, qualifications and experience, together with copies of 2 recent testimonials, to the Group Secretary, Wrexham, Powys and Mawddach Hospital Management Committee, Maelor General Hospital, Wrexham, as soon as possible.

WREXHAM (near). TREVALYN MANOR MATERNITY HOSPITAL, ROSSETT, near WREXHAM. (47 Beds.) Applications are invited for the post of HOUSE SURGEON at the above Hospital to commence 1st August, 1956. The Hospital is recognised by Central Midwives Board as a Part II Midwifery Training School and deals with normal and abnormal midwifery.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, to be sent to the Group Secretary, Maelor General Hospital, Wrexham, as soon as possible.

WORCESTER ROYAL INFIRMARY. (213 Beds.) House SURGEON (pre-registration or otherwise) required. Recognised for F.R.C.S. examination.

Applications to the Secretary.

Public Appointments

CHESHIRE COUNTY COUNCIL. Applications are invited from registered medical practitioners for appointment as SENIOR ASSISTANT MEDICAL OFFICER on the County Medical Staff. The work will be concerned mainly with children under 5 years of age, and will include assistance in supervising child welfare centres and the work of health visitors. A knowledge of mental ill health and its prevention in young children will be an advantage. The appointment is superannuable and subject to medical examination. The salary scale will be that applicable to Assistant Medical Officers plus £125 at all stages, i.e., £1175–£50–£1325–£55–£1600. Previous experience will be taken into consideration, and car and subsistence allowance will be paid according to the County scale.

Forms of application may be obtained from the undersigned, to whom they should be returned by 14th July.

ARNOLD BROWN, County Medical Officer.

24, Nicholas-street, Chester.

COVENTRY CORPORATION require School Medical OFFICER AND ASSISTANT MEDICAL OFFICER OF HEALTH (joint post) for duties connected with medical inspection and clinic treatment of school-children, maternity, and child welfare work and such other duties as the Medical Officer of Health and Principal School Medical Officer may include from time to time. Qualifications/experience in ascertainment of handicapped pupils an advantage. Salary £975–£1375 (new award pending). Commencing salary according to experience/qualifications.

Applications and full particulars to Medical Officer of Health, New Council Offices, Coventry.

FACTORY DOCTORS. Factories Acts 1937 and 1948. The following appointment as Appointed Factory Doctor is vacant. Apply to Chief Inspector of Factories, 8, St. James's-square, London, S.W.1.

District	*County*	*Latest date for receipt of applications*
WESTON-SUPER-MARE ..	SOMERSET ..	7TH JULY, 1956

HOVE. BOROUGH OF HOVE—Senior Assistant Medical OFFICER; EAST SUSSEX COUNTY COUNCIL—SCHOOL MEDICAL OFFICER. Applications are invited for the above permanent appointments from Male registered medical practitioners possessing the D.P.H. The combined salary scale is £1155 p.a., rising by 3 annual increments of £50 and 5 of £55 to £1580 p.a. Account will be taken of previous experience in fixing the commencing salary. Car allowances are paid. The duties include work in connection with Public Health, Infectious Diseases, Child Welfare, and School Medical Services.

Further particulars and application forms may be obtained from the undersigned to whom applications should be sent so as to arrive not later than Saturday, 30th June, 1956.

Town Hall, Hove, 3. JOHN E. STEVENS, Town Clerk.

GOLD COAST LOCAL CIVIL SERVICE. Gold Coast MEDICAL SERVICE. Applications are invited from doctors for the following posts in the Gold Coast Local Civil Service :—

(1) MEDICAL OFFICERS for general duties including hospital and district work.

(2) MEDICAL OFFICERS OF HEALTH. Diploma of Public Health or a similar recognised qualification required.

Appointment may be as follows :—

(*a*) Contract for 2 tours of duty of 18–24 months with gratuity (taxable) at the rate of £12 10s. for each completed month of service.

(*b*) On 3 years probation for permanent and pensionable employment. Pension (non-contributory) is earned at the rate of 1/600th of the final pensionable emoluments for each completed month of service.

(*c*) Doctors in the National Health Service may leave the National Health Service but retain their superannuation rights while in the Gold Coast (up to 6 years) and receive a gratuity (taxable) of 20% of their Gold Coast salary.

Salaries for officers appointed under (*a*) range from £1330 to £2310 a year and under (*b*) and (*c*) £1055 to £1850 a year, starting point being determined by qualifications and experience.

Quarters at rental not exceeding £150 a year. Income-tax at local rates. Free passages for Officer, wife, and up to 3 children under 13 years of age. Annual local leave is permissible and generous home leave is granted after each tour.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting BCD. 117/13/04).

GOLD COAST LOCAL CIVIL SERVICE. Ministry of HEALTH. GOLD COAST. SPECIALIST MALARIOLOGIST required to organise treatment and anti-malaria campaigns. Candidates should be qualified doctors and have had experience of malaria control and research. Appointment is to the Gold Coast Local Civil Service on contract of 2 tours of 18–24 months each in first instance with gratuity (taxable) on satisfactory completion of service. Salary scale £2400–£2700 a year. Gratuity payable at the rate of £12 10s. for each completed month of service. Cost-of-living allowance £29 15s. a year. Candidates in the National Health Service may leave the National Health Service but retain their superannuation rights (up to a maximum stay of 6 years). Salary, in this case, would be in the scale £1900–£2200 a year, and the gratuity 20% of the aggregate of salary. Starting point in both scales according to qualifications and experience. Quarters at rental not exceeding £150 a year. Income-tax at local rates. Free passages for Officer, wife, and up to 3 children under 13. Generous home leave after each tour.

Applications to Director of Recruitment, Colonial Office London, S.W.1 (quoting BCD. 117/13/021).

HER MAJESTY'S OVERSEA SERVICE. Medical Officer required in North Borneo for day to day general clinical work in tropical and other diseases, maternity and child welfare, promotion of public and rural health and sanitation, with a limited amount of routine administrative functions. He may be called upon to perform emergency surgery and to attend to midwifery cases. Candidates must possess qualifications registrable in the United Kingdom. Appointment will be on 3 years probation for permanent and pensionable employment or on short-term contract with gratuity payable on completion of satisfactory service. Salary scale from $885 to $1435 a month (£1239–£2009 a year). 1 North Borneo dollar = 2s. 4d. Starting salary depends upon age, qualifications and experience. Cost-of-living allowance also payable, up to approximately £182 a year, determined by the Officer's salary and family circumstances and subject to periodic revision. Private practice not allowed but consultation permitted in certain circumstances. Quarters provided at low rental. Income-tax at local rates. Free passages in both directions for Officer, wife, and up to 3 children under 18. Normal tour of service is from 30 to 36 months. Local leave is permissible and generous home leave after each tour. Pension is earned at the rate of 1/600th of final pensionable emoluments for each completed month of service.

Application forms from the Director of Recruitment, Colonial Office, London, S.W.1 (quoting BCD. 117/21/04).

NATIONAL COAL BOARD. North-Eastern Division. Applications are invited for the vacancy of AREA MEDICAL OFFICER in the Barnsley Area of the North-Eastern Division. Candidates should have experience in the field of preventive and industrial medicine and a knowledge of the coalmining industry will be an advantage. The work will include making underground visits to collieries. Salary, according to qualifications and experience, will be within the range of £1400–£2150 p.a.

Detailed applications, giving the names of 2 referees, should be sent to the Staff Director, National Coal Board, Holmwood House, Ecclesall-road South, Sheffield, 11, to arrive not later than 30th June, 1956. Envelopes should be marked "Staff Vacancy."

NORWICH. CITY OF NORWICH. Applications are invited from Female registered medical practitioners for the post of ASSISTANT MEDICAL OFFICER OF HEALTH AND SCHOOL MEDICAL OFFICER. Salary scale £975, rising by annual increments of £50 to £1375 p.a., subject to the increase recently agreed by the Medical Whitley Council.

For further particulars apply to the Medical Officer of Health, 68, St. Giles-street, Norwich.

CANCER CLINIC ASSOCIATE

(No. 4192)

ALLAN BALIR MEMORIAL CLINIC
REGINA, SASK.

Salary: $535 per month with automatic annual increases to $635 per month.

Requirements: Graduation from a recognised medical school preferably supplemented by special courses in surgery, pathology and general medicine and at least 2 years postgraduate work experience in clinical medicine associated with the diagnosis and treatment of cancer.

For application forms and details write to Personnel Officer, Department of Public Health, Provincial Health Building or Public Service Commission, Legislative Building, Regina, Sask., Canada.

General Practice

For an Executive Council post (England and Wales) apply on form E.C.16A obtainable from the council. Mark envelope "Vacancy."

BINFIELD, near BRACKNELL, BERKSHIRE. Applications invited for VACANCY due to resignation, arising 7th September, 1956. Semi-rural practice. "Intermediate" area. Approximate list 1825, of which approximately 1400 are dispensing patients. Surgery premises available for purchase. Apply on Form E.C.16A not later than 30th June, 1956, to—

G. H. J. PRICE, Clerk, Berkshire Executive Council.
16, Eldon-road, Reading.

DIDCOT, BERKSHIRE. Applications invited for VACANCY due to resignation, arising 1st September, 1956. Semi-rural practice. "Intermediate" area. List approximately 890, of which approximately 290 are dispensing patients. Residence at Haddon Close, near Didcot, and surgery with flat in Didcot, available for purchase. Apply on Form E.C.16A not later than 30th June, 1956, to—

G. H. J. PRICE, Clerk, Berkshire Executive Council.
16, Eldon-road, Reading.

Appointment: Too Late for Classification

TORQUAY. TORBAY HOSPITAL. (166 Beds.) Senior RESIDENT HOUSE OFFICER (anæsthetics) required as soon as possible. There is a complement of 6 Resident House Officers and the Hospital is recognised for the D.A. and for the F.F.A.R.C.S.

Applications, stating qualifications, age, nationality, with copy testimonials, to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, S. Devon.

Hospital Services: Non-Medical Appointments

NORTHAMPTON GENERAL HOSPITAL. Department OF BIOCHEMISTRY. Experienced BIOCHEMICAL TECHNICIAN required immediately to fill Senior Technician Grade 1 post in above Department.

Applications, with references, should be addressed to Dr. D. PHILPOTT, F.R.I.C., General Hospital, Northampton.

ROCHDALE AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. The whole-time post of BIOCHEMIST to the Rochdale Group of Hospitals is now vacant and applications will be considered at senior or basic grade level according to qualifications and experience. The successful applicant will be required to work under the Consultant Pathologist and to perform biochemical estimations and examinations for the hospitals and clinics of the Group. Further details may be obtained from the Group Pathologist, Birch Hill Hospital, Rochdale. Commencing salary dependent on qualifications and experience, rising to a maximum of £1230 p.a. (senior grade).

Applications, together with names and addresses of 3 referees, should be forwarded to the Group Secretary, Central Offices, Birch Hill Hospital, Rochdale, Lancs, as soon as possible.

Miscellaneous

The National Marriage Guidance Council invites applications for the appointment of a part-time Regional Tutor in the Manchester-Liverpool area to assist in the supervision and further training of voluntary part-time marriage counsellors. Professional qualifications in psychology, psychiatry or social science are required and experience in the training and supervision of social workers would be an advantage. The appointment will involve the equivalent of 1 working day per week and the salary offered is £150 p.a. plus travelling expenses.

Further particulars and application form from Training Officer, N.M.G.C., 78, Duke-street, London, W.1.

Applications are invited for the appointment of a Medical Officer with a leading British Company in British West Africa. Applicants should not be more than 35 years of age and should have had good all-round experience since qualifying. Salary will be in accordance with age, experience, and qualifications, but will not be less than £1500 p.a. In addition there are family allowances, free passages to and from West Africa, and free furnished quarters. Membership of Pension Fund is compulsory. Tours of duty will be up to 21 months followed by leave on full pay.

Applications, giving full details of experience, should be made to the Principal Medical Officer, Unilever House, Blackfriars, London, E.C.4.

Assistant Medical Officer required by large industrial concern (light engineering) in West Middlesex. Minimum salary £1200 p.a.—Write, giving particulars of age, qualifications and experience, to: Address, No. 231, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Medical Officer required by large Oil Company for service initially based on London but entailing overseas tours of duty and eventually for permanent service in the Middle East. Preference will be given to bachelors under 37 with overseas experience and some knowledge of tropical work. Substantial salary, pension scheme.—Write, quoting No. 646, to Box No. 117, c/o CHARLES BARKER & Sons LTD., 31, Budge-row, London, E.C.4.

Wimpole-street, W.1. To let for medical or dental purposes. 1 large room and small room. First floor. Rent £400 p.a. inclusive. Use of waiting-room. Central Heating. Lift. Attendant. Also large room. Ground floor, £250 p.a. inclusive. —Details from CHAMBERLAIN & WILLOWS, 23, Moorgate, E.C.2 (MET 8001).

Swiss Alps. Home school for children 4–12. Madam Bela takes 25 children with her own 5 for school subjects. Excellent food and care of health. Ideal for delicate children. Children welcomed for full school year or shorter periods.—Apply for details to "LA BELLE MAISON, Caux-sur-Montreux

The Proprietor of British Patent No. 667744 for "Injector" desires to enter into negotiations with a firm or firms for the sale of the patent or for the grant of licences thereunder.—Further particulars may be obtained from MARKS & CLERK, 57 & 58, Lincoln's Inn-fields, London, W.C.2.

"Pregnancy Diagnosis by the Xenopus Method," 24-hour service. Send specimen of urine and £1 1s. fee. Hæmatology Biochemistry, Flame Photometry.—WELBECK BIOLOGICAL LABORATORIES, 26, Park-crescent, Portland-place, W.1 (MUSeum 5386–7).

Applicants for posts requiring testimonials copied or duplicated should communicate with MANTON SECRETARIAL SERVICE LTD., 98, Victoria-street, S.W.1 (Phone: VICtoria 0141), who are specialists in this kind of work.

Typewriting and Duplicating. First-class work at moderate prices by experienced medical typists. Electric machines. —SYBIL RANG, 21, Heath-street, Hampstead, London, N.W.3 (HAM 5329/0504).

Microscopes. Highest prices paid for good modern types. Send or bring your equipment for valuation.—WALLACE HEATON LTD., 127, New Bond-street, W.1.

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'HYDRODERM' provides the anti-inflammatory steroid hydrocortisone, incorporated in an emollient base with the antibiotics neomycin and bacitracin. Specific activity is provided against both inflammation and infection. Use of these two broad-spectrum antibiotics assures protection from a wide variety of organisms commonly found in skin lesions. Neither neomycin nor bacitracin is likely to cause a local reaction, and their use does not contra-indicate the concurrent use of other antibiotics systemically. Topical Ointment of 'HYDRODERM' is supplied in tubes of 5 G. and 15 G.

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MERCK SHARP & DOHME LIMITED, HODDESDON, HERTS.

Chlorpromazine is now being increasingly adopted in general practice for the management of the elderly sick or infirm patient. Published reports reveal that in the elderly, good results have been obtained in:

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SUPPLIES: Tablets—10 mgm., 25 mgm. and 100 mgm. Syrup containing 25 mgm. per 3.6 c.c. (approx. 1 teaspoonful). Solutions for injection—0.5% in 5 c.c. ampoules; 2.5% in 1 c.c. and 2 c.c. ampoules. Suppositories containing 100 mgm. base.

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